STEEL

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For forty-eight years—IRON TRADE REVIEW

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Rolled Steel Floor Plate—in Diamond, Diamondette and Ribbed Patterns,
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Circulation Manager

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Volume 91 Number 16

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

OCT. 12 is set apart to commemorate Columbus' discovery of America; Oct. 13 may go down in history as the day when Canada reversed the flow of empire and discovered Great Britain. Certainly the publication last Thursday of trade agreements adopted at the recent Imperial Economic conference at Ottawa inaugurates a new era in Canadian-American relations—an era frankly dedicated by the dominion to restricting a maximum of its imports to the Empire. In the case of iron and steel, British producers are heavy winners, as every change in the Canadian tariff (p. 11) disadvantages American mills. And Canadian requirements are three-quarters of American foreign trade in iron and steel, being 109,318 tons out of 147,065 in eight months of 1932.

Tariff Troubles Internal as Well as External

However, no less a foreign trade authority than James A. Farrell believes (p. 12) that the natural affinity of Canadian and American trade will surmount any artificial barrier. . . . Nor is Canada alone in thrusting a tariff problem upon an already-harassed American industry. With the national election only three weeks distant, there is speculation in the markets (p. 43) concerning a possible lowering of the tariff which, judging from complaints before the tariff commission and the treasury, already is inadequate. . . . The United States itself is safeguarding its home market. The customs bureau is requiring (p. 16) that bundles of cotton ties be marked with the country of origin, and New York is asked (p. 12) to exclude alien steel on municipal work.

Small Users Need Support of Tonnage Buyers

Steel production in the week ended Oct. 15 rose to 19.5 per cent, highest since early June and representing an expansion from 13.5 per cent in six weeks (p. 51), but this advance gives evidence of being about the limit to which small orders can support the market. . . . Needed reinforcement from the railroads is an early possibility (p. 47) as the Pennsylvania, Reading and Baltimore & Ohio equipment repair and building programs are speeded by R. F. C. loans. . . . Largest project yet underpinned by federal money is the San Francisco-Oakland bridge (p. 48) requiring upward of 190,000 tons of steel shapes, cable and reinforcing bars. . . . On the Pacific coast (p. 61) a lift is being felt as a result of loans by Washington.

Cleveland a Laboratory for Steel Houses

Upon the steel house, producers of steel confer great hopes for a broad, future market, and at Cleveland last week two houses of dis-similar design—one frameless and one with a steel frame but both finished with porcelain enamel shingles—were completed and opened for in-

—*Acme Photo*

Steel girder bridge, said to be the first of its kind, across the Ruhr river at Duren, Germany

spection (p. 32). The frameless house was christened with appropriate ceremony. A third house, featuring a steel frame and an exterior of asbestos, is nearing completion at Cleveland.

Steel Almost Plastic to Auto Body Designers

Radical in a degree comparable with the steel house in the building industry are the new streamlined automobile bodies which, when introduced at the shows in January, will break completely with the past in automotive design (p. 17). Fenders which completely mask the undergear, extreme sloping radiator shells, bodies which hug the ground and curve inward rapidly at the top, concealment of spare tires —these departures will stamp cars of the vintage of 1932 or earlier as ante-teardrop. Steel is the material most easily adaptable for the new body types; it is a new use in an old field. With lower centers of gravity, narrower treads become safe, and 56½ inches no longer is standard.

Years Pass in Minutes, in Erosion Test

Metal erosion, such as is encountered in ship and airplane propellers and hydraulic turbine runners is stimulating development of more sturdy material, and to accelerate tests (p. 21) specimens of new material are mounted on a disk and revolved at high speed across jets of water, which reduces years of wear to minutes. . . . Only actual years of experience, however, are a safe guide in open-hearth furnace practice (p. 24) and there is no short cut to data on furnace bottom refractories and heat flow and temperature gradients through bottoms. . . . Pittsburgh reports demand for refactories (p. 50) the best in three months, more furnaces being prepared for service.

Rehabilitation Program an Aid to Tool Builders

Machine tool builders in convention last week built up hopes for better business on the campaign for industrial rehabilitation being furthered by Washington (p. 13). To reduce prices would conjure up no additional business and only deplete earnings, it was agreed. . . . Too new to have reached the rehabilitation stage is the manufacture of telescopic mooring masts (p. 28), such as installed recently at Lakehurst, N. J. . . . An uncultivated field offering much promise is that of welded steel products (p. 33), which delegates to the recent American Welding society meeting at Buffalo adjudged in need of promotion efforts.

Outstanding in Technical News of the Week:

Corrosion-resisting properties of various steels are ascertained by the navy department (p. 35) by subjecting specimens to a 24-hour salt spray test. . . . An important though little known consumer of steel is the photoengraving industry (p. 38), requiring sheets, wire and tubing for the manufacturers of whirlers. . . . Rapid handling of seamless tubes in and out of car bottom annealing furnaces has been found (p. 36) to reduce heat losses and speed up production. . . . When composition gears mesh with metallic gears, noise in gear trains disappears (p. 35). A spoke-type fibre gear is acclaimed the quietest of all, making only one third the noise of a solid one. . . A paint has been developed (p. 36) that is resistant to steam, hot water and rust, useful for coating the interior surfaces of boiler tubes and drums.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

To the Editor:

It is earnestly to be hoped that the experts who assume to advise us in regard to things to be done to improve business conditions will soon find some method other than taking money from one for the benefit of some other, any other in fact, as every conceivable kind of beneficiary of the ill-conceived schemes has been considered.

To relieve the consequences of unemployment, insurance is suggested, the cost to be borne at least partly or according to some schemes entirely by the employer, although all such charges would eventually have to be charged against the value of any employe to his employer; also in spite of the fact that insurance against the consequences of losing his job would destroy the one and only incentive that keeps a vast number of people doing anything approaching reasonable work. Also in spite of the impossibility of determining whether any given employe was fired for good and sufficient reason or was laid off because of a real lack of work and also in spite of the unlimited opportunity for fraud and collusion in the administration of such insurance.

There is one thing from which relief is needed and that is from the crop of political relievers.

MANUFACTURER

Our standard of living has been broken and we must fight to bring it up again. I am for higher wages—not lower. I have been opposed to wage reductions over the past three years, and have seen no benefits from them, but harm through decreased buying capacity and breaking down of home standards.

We have built up a great productive capacity and to occupy it and furnish proper employment to our people we must be a nation of liberal buyers, and this necessitates liberal earnings which can show a margin over and above cost of actual necessities. We must solve the question of unemployment, and if my analysis is correct, then we must have liberal earnings for our workers.

E. T. WEIR
Chairman,
National Steel Corp.

From an address by Mr. Weir, speaking before the Pittsburgh chamber of commerce, in his capacity as vice chairman of the National committee on industrial rehabilitation.

Higher Tariff Diverts Steel Needs of Canada to Britain

CANADA'S revised tariff duties, flowing from the Imperial Economic conference held at Ottawa, Ont., in July and August and taking effect simultaneously with their publication Oct. 13, leave no doubt concerning the dominion's intention of diverting as large a proportion of its iron and steel requirements as possible to Great Britain.

An examination of the new rates, which are appended to this article, discloses that on every important iron and steel product the advantage is with mills in Great Britain or those countries having special tariff arrangements with Canada.

A leading authority in Canada gives it as his opinion that the revision will result in turning approximately 40 per cent of Canada's import business over to Great Britain, against a former 10 to 15 per cent. He forecasts that within the next year or two the proportion may run to 50 to 60 per cent.

British mills derive a substantial advantage from the following products being admitted free on the preferential list: Bars, steel sash and casement windows, tram rails, stainless steel, black plate for coating, electrical sheets, structural shapes not less than 35 pounds per yard, not fabricated, and wide plates.

Through a reduction of the duty on the preferential list, British mills also are aided on the following products: Railroad car axles and hoops over 0.080-inch.

Strikes at U. S. Trade

On the following products the preferential duty is left unchanged or continued free, while rates in the intermediate or general classes, or both, are raised, which also has the effect of disadvantaging American mills: Ingots, plates, sheets, steel railroad ties, practically all wire products, hoops under 0.080-inch thick, cold-rolled strip, tin-plated sheets, plates, hoops, etc., not made in Canada, and zinc-plated sheets, hoops, plates, etc.

The seriousness of this revision of Canadian duties to American trade becomes apparent when it is considered that in the first eight months of 1932, Canada took 109,318 gross tons of the 147,065 tons of iron and steel exported by the United States. In the first eight months of 1931, Canadian exports accounted for 337,587 tons of the total of 407,362. In eight months of 1932, United States imports of iron and steel totaled 251,034 tons, of which 15,958 tons originated in Canada. In the same period of 1931, Canada supplied 30,933 tons of the total of 300,271 imported by the United States.

Officials of the Algoma Steel Corp. declare that the tariff changes will have no effect upon their plant at Sault Ste. Marie, Ont., since they do not produce products on which the most drastic changes have been made.

An official of Baines & David Ltd. states that the new duties will especially turn imports of galvanized sheets, heavy girders, I-beams and tram rails to Britain. He points out that while the local market for galvanized sheets is now largely supplied by Ontario producers, there is a market in the eastern provinces for 15,000 tons annually, which is almost certain to be filled by the British.

Heavy girders and I-beams, not produced in Canada, and which formerly were imported from the United States, are almost certain to have a much larger import demand from Britain in the future. He states, however, that there has been some trouble with lengths of structural shapes from Britain.

Canadian fabricators have become used to the long 60-foot shapes and there may be some tendency to continue drawing from across the line unless the longer sizes are available in Britain.

In mitigation of the new rates, it is contended by Canadian offcials that the proximity of American mills and their ability to make more prompt shipments will partially offset the higher imports.

Following are the more important Canadian iron and steel tariff rates, the new ones effective Oct. 13 being compared with the old. Reading left to right, the first rates are preferential ones, the second are intermediate, the third are general. Preferential rates apply to imports from Great Britain. Intermediate rates are effective on shipments from nations having special trade agreements with Canada; in this class largely fall other portions of the British empire. The general rates apply to those countries which have no special trade agreements with Canada, including the United States.

Rate Details Tabulated

(c)—Ingots, cogged ingots, blooms, slabs, billets, n.o.p., of iron or steel, of a class or kind not made in Canada, when imported by manufacturers of forgings for use exclusively in the manufacture of forgings, in their own factories, under regulations prescribed by the Minister, per ton—

New—	Free	$3.00	$3.00
Old—	Free	$2.25	$2.50

378—Bars and rods, of iron or steel, billets of iron or steel, weighing less than 60 pounds per lineal yard—

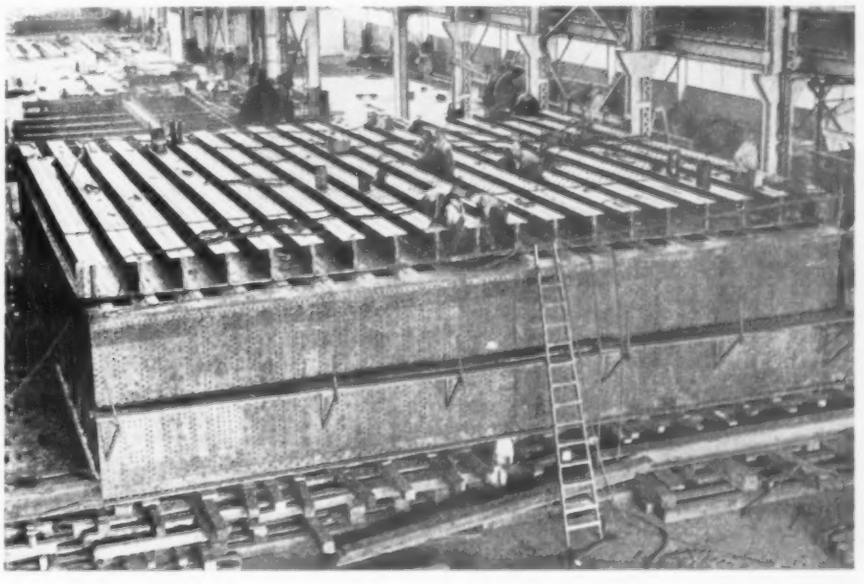
(d)—Hot rolled, valued at not less than 4 cents per pound, n.o.p.—

New—	Free	12½%	15%
Old—	5%	12½%	15%

379e—Bars of iron or steel, hot rolled, 5 inches in diameter and larger, when imported by manufacturers of polished shafting for use in their own factories, per ton—

New—	Free	$7.00	$7.00
Old—	$4.25	$7.00	$7.00

(f)—Sash or casement sections of iron or steel, hot or cold rolled, not punched,



Acme Photo

WILL STAND UP AGAINST 58,000 TONS AND LIKE IT: First of two steel gates which will turn the Colorado river into Boulder, or Hoover, dam has been completed at the Consolidated Steel Co. plant in Los Angeles

drilled nor further manufactured, when imported by manufacturers of metal window frames, for use in their own factories, per ton—

New—	Free	$7.00	$7.00
Old (a)—	$4.25	$7.00	$7.00
Old (b)	15%	25%	30%

380—Plates of iron or steel, hot or cold rolled—

(a)—Not more than 66 inches in width, n.o.p., per ton—

New—	$4.25	$8.00	$8.00
Old—	$4.25	$6.00	$7.00

(b)—More than 66 inches in width, n.o.p., per ton—

New—	Free	$6.00	$6.00
Old—	Free	$3.00	$5.00

(c)—Flanged, dished or curved, n.o.p.—

New—	10%	25%	30%
Old—	10%	25%	30%

381—Sheets, of iron or steel, hot or cold rolled—

(a)—0.080 inch or less in thickness, n.o.p.—

New—	7½%	20%	20%
Old—	7½%	12½%	12½%

393—Tires, of steel, in the rough, not drilled or machined in any manner, for railway vehicles, including locomotives and tenders.

New—	Free	10%	10%
Old—	Free	5%	7½%

394—Axles and axle bars, n.o.p., and axle blanks, and parts thereof, of iron or steel.

(a) For railway vehicles, including locomotives and tenders.

New—	10%	27½%	30%
Old—	20%	27½%	30%

401—Wire, of iron or steel.

(a) Barbed fencing, coated or not.

New—	Free	10%	10%
Old—	Free	Free	Free

(b) Twisted, braided or stranded, including wire rope or cable, coated or not, n.o.p.

New—	15%	25%	25%
Old—	15%	22½%	25%

(c) Drawn Zat or cold rolled Zat after drawing, coated or not, n.o.p., not more than .25 inch in width and less than .1875 inch in thickness.

New—	7½%	20%	20%
Old—	7½%	15%	20%

(d) Coated with zinc or spelter, curved or not, in coils, .144, .104, or .092 inch in diameter, with tolerance not to exceed .004 inch, and not for use in telegraph or telephone lines.

New—	Free	10%	10%
Old—	Free	Free	Free

(e) Coated with zinc or spelter, n.o.p.

New—	10%	20%	20%
Old—	10%	17½%	20%

(f) Single or several, coated, n.o.p., or covered with any material, including cable so covered.

New—	15%	30%	30%
Old—	15%	25%	30%

(g) N.o.p.

New—	15%	20%	20%
Old—	15%	17½%	20%

382—Hoop, band or strip, if iron or steel:—

(a) Hot rolled, .080 inch or less in thickness, n.o.p.—

New—	7½%	15%	15%
Old—	7½%	12½%	12½%

(b) Hot rolled, more than 0.080 inch in thickness, n.o.p., per ton—

New—	$4.00	$8.00	$8.00
Old—	$4.25	$5.00	$7.00

(c) Cold rolled or cold drawn, .080 inch or less in thickness, n.o.p.—

New—	7½%	20%	20%
Old—	7½%	12½%	15%

(*Please turn to Page* 64)

Protests Delay on Manganese Probe; More R.F.C. Loans; News of Washington

J CARSON ADKERSON, president of the American Manganese Producers association, has sent a letter to Secretary of the Treasury Mills protesting against the action of the customs bureau in withholding appraisement reports covering steel products pending the result of the dumping investigation, on the ground that his association has asked for his action for two years on manganese ore, and been refused.

"The action of the treasury department," says Mr. Adkerson, "in granting this relief of steel products, when similar action has been consistently denied on imported manganese ore, is highly discriminating in favor of steel and utterly repugnant to domestic manganese producers, manganese property owners, and their former employes in manganese districts of 34 states.

"For two years," continues Mr. Adkerson, "the manganese industry has been paralyzed by the dumping of Soviet managanese ore in the United States. For two years American manganese producers have been asking the treasury department for the same order on manganese which has now been given by the treasury department as a safeguard to steel products."

□ □ □

Most important of all decisions thus far by Reconstruction Finance Corp. to the iron and steel industry is its backing of the proposed San Francisco Bay bridge linking San Francisco and Oakland.

This structure, estimated to require 170,000 tons of structural material and cable and 20,000 tons of concrete reinforcing bars, will be 4½ miles long, double decked, and will cost $70,000,000, of which the R.F.C. will take up $62,000,000. Practically all the structural material will be fabricated in the western and central states.

The New York, New Haven & Hartford railroad has been granted an R.F.C. loan of $700,000, the first advance to be made about Nov. 1, for repairing 93 locomotives and 160 freight cars in the company's own shops. It is estimated that the work will require six months and 400 employes.

Further conferences have been staged by the R.F.C. and officials of the Port of New York Authority regarding a loan for the proposed vehicular tunnel at Thirty-eighth street, New York, requiring 150,000 tons of steel. A formal application for a loan has not yet been filed.

Eight self-liquidating loan projects in Kentucky, Ohio, Illinois and Washington totaling nearly $3,000,000 have been announced by the R.F.C. The majority are for enlargement or construction of municipal waterworks.

In connection with the loan of $1,491,000 to Seattle, it is estimated that some 3500 tons of cast iron pipe and 4800 feet of 78-inch steel pipe will be required.

A loan of $190,000 was made to the Savanna-Sabula Bridge Co. for

(*Please turn to Page* 16)

Ask New York To Prohibit Alien Steel on City Work

New York—The city board of estimate has been asked by Charles M. Schwab, chairman of the American Iron and Steel institute, and R. W. Johnson, of the Concrete Reinforcing Steel institute, to prohibit the use of foreign steel in municipal projects.

The steel industry is doing a heroic job in trying to distribute employment under distressing circumstances, the board was informed, while dumping of foreign steel imperils "the standard of living of our working people."

T. J. Doherty, tariff attorney for the American Iron and Steel institute, advised the board that the treasury department at Washington is investigating dumping and may supply some relief.

Farrell Sure Canadian Trade Will Survive Tariff Barrier

Over a period of 60 years trade relations between the United States and Canada have been favorable to Canada, and the trade agreements growing out of the recent Imperial Economic conference at Ottawa, Ont., will not make any lasting change in the situation, declares James A. Farrell, former president of the United States Steel Corp. and head of the National Foreign Trade council.

Seneca O K's Merger

Stockholders of the Seneca Iron & Steel Co., Buffalo, meeting Oct. 14 approved plans for a merger with the Bethlehem Steel Corp., as stated in STEEL for Oct. 3, page 11. Legal details will delay actual consummation of the merger until about Nov. 1.

Machine Tool Builders To Revive Their Industry

WITH the continuation of depression conditions, sessions of the thirty-first annual convention of the National Machine Tool Builders' association in Swampscott, Mass., Oct. 9-11, were devoted exclusively to economic consideration and to efforts to revive both tool manufacturing and selling. The final day was devoted to a joint meeting with the Associated Machine Tool Dealers, who conducted their own meeting on the succeeding two days.

Considerable discussion centered about prices with the general opinion that price reductions on standard tools would in no way stimulate volume at this time.

Plans of the National Committee on Industrial Rehabilitation were outlined by A. W. Robertson, chairman of the board, Westinghouse Electric & Mfg. Co., chairman of the committee. Declaring the backbone of the depression had been broken, that the real financial panic period had been overcome, he said the time for necessary replacement and equipment buying had arrived.

Signal Lights Green

Industry, he said, could now logically plan toward the future with a reasonable degree of safety. As late as last May and June this would have been impossible; such a movement then would have been useless. He pointed to the fact that equipment can now be purchased and installed at a lower cost than during active periods of business. Mr. Robertson reiterated the fact that during periods of rising prices, buying is stimulated. Such an industrial rehabilitation movement might easily have an influence toward stiffening prices.

A speaker at the dinner was Ambrose Swasey, founder of the Warner & Swasey Co., Cleveland, who gave interesting reminiscences of earlier days in the machine tool industry and predicted a brighter future.

Few machine tool builders ship in dollar sales annually volume equal to one dollar invested, two-thirds of the members of the association being members of the group taking orders of $200,000 or less while the average sales per dollar invested in the industry averages close to 80 cents, according to President Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill. Mr. Gaylord ventured the opinion that peacetime general industrial needs would have to multiply several times to warrant material group expansion on the part of the machine tool industry. He indicated that 60 per cent of the dealers sell direct while 40 per cent of sales are made through dealers, the latter being an important factor in distribution.

He admitted harmful practices had crept into the selling of machinery, citing price cutting, special discounts, undue allowances and other factors tending to weaken the selling structure and reducing profits during the present depression. He indicated that with the second half of the present year estimated total sales in 1932 would approach $18,000,000 against slightly more than $80,000,000 average over a given period of recent years considered as normal. He pointed to increased competition and stated the true function of a trade association was not to defend old methods, but to co-operate.

Following the address by President Gaylord, the new general manager of the association, Herman H. Lind, was introduced and outlined briefly his plans for plant visitation in the near future.

Henry S. Beal, general manager, Jones & Lamson Machine Co., Springfield, Vt., opened the discussion on "What is the Proper Profit Policy for Machine Tool Builders in Periods of Depression," with a highly praised paper. This discussion brought out a difference of opinion as to pricing in dull periods. Mr. Beal stated that in a general way volume depended on labor saving made possible by the machine, its price and the work it does. Reduction in special tools has been more apparent and while such tools are designed and built for special purposes, some dealers in their efforts to get business fail to take into consideration additional costs, writing off profits to a dangerously low point. The price decline in standard tools has been less noticeable. Price, while a factor, said Mr. Beal, is not a 100 per cent factor, but life, quality and work are also important.

Mr. Beal showed that prices during the period of the last 10 years should have been higher during the more prosperous times. He strongly favors the one price policy, stating there was nothing to indicate an increase in volume by price reductions in depressions, but that prices would likely vary with the value of the dollar, or at least pressure would be felt toward that end. Any changes in pricing should be public and on the regular list, rather than special concessions.

Two Angles on Pricing

E. C. Bullard, Bullard Co., Bridgeport, Conn., stated price to the builder was his idea of what he thinks a tool is worth while the buyer's idea of price was the tool's value to him and that pricing should be considered from both angles.

W. E. Whipp, president and general manager, Monarch Machine Tool Co., Sidney, O., declared that machine prices were never high enough in the boom times to carry the average builder securely over the dips in the business cycle, speaking especially of standard tools. He stressed constant improvement in machine design with its resultant higher production.

On an active market, lower prices will stimulate sales, but this will not follow in a depression, according to Henry K. Spencer. Return should, however, be sufficient in active periods to allow for a reserve when the decline arrives. He said the buyer would point to his own lower prices and decline in various materials in arguing for lower machine prices.

A. J. Gifford, Leland-Gifford Co., Worcester, Mass., took the view that violation of the one-price policy was indefensible and that price has little influence on the demand for standard tools. He predicted a movement toward the cost-plus idea in the sale of special tools as being more satisfactory and safer to both the buyer and seller.

Raymond Perry, vice president,

New Officers

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

President

HENRY S. BEAL

General manager, Jones & Lamson Machine Co., Springfield, Vt.

First Vice President

EDWARD A. MULLER

President and treasurer, King Machine Tool Co., Cincinnati

Second Vice President

RICHARD A. HEALD

Secretary-treasurer, Heald Machine Co., Worcester, Mass.

Treasurer

F. H. CHAPIN

President, National Acme Co., Cleveland

Directors

H. H. PEASE

President, New Britain-Gridley Machine Co., New Britain, Conn.

CHARLES J. STILWELL

Vice president, Warner & Swasey Co., Cleveland

J. G. BENEDICT

Treasurer and general manager, Landis Machine Co., Waynesboro, Pa.

Ingersoll Milling Machine Co., Rockford, Ill., declared that purchase of a machine tool is a capital investment on the part of the buyer, a purchase of sustained worth, and, like stock, the initial cost of the unit is not the important factor, but rather its earning power. Machines on which earnings are high should command a higher price even though the cost of producing the machine is approximately equal to another earning less. The mechanical ability of the machine to produce and earn is a factor.

C. J. Stilwell, Warner & Swasey Co., Cleveland, declared that the lowering of the price structure was no cure for the dealer needing money and that departure from firm prices at this time by any firm or group stands out in the current depression, a buyers' market. He stated experience based on the last serious decline in volume showed conclusively business was not stimulated by price reduction; that as a matter of fact it slowed up buying. If profits now are too low, he advised against making them lower by reduction in quotations.

Sees New Problems

Definite trends in the industry likely to be considered in future problems were traced by E. H. Schell, department of business and engineering, Massachusetts Institute of Technology. Out of the depression, Prof. Schell sees an increased competition on the part of the new and small machine tool manufacturer. Many expert machinists and designers, now out of employment, will, when conditions improve, enter business in a small way themselves. A highly mechanized civilization will probably mean less time and work per person and will probably mean more persons per machine, another view expressed by the speaker.

A national simplicity in machine operation, another factor effecting design, is also ahead. The heyday of the machine tool industry was in the days of its pioneering, Prof. Schell stated, and a return to that concept as applied to new conditions required for mass production is desired which may be brought about by the selling of the super-machine, or entire units or batteries with stress on the product significance rather than that of process.

Col. L. S. Horner, vice president, Bullard Co., Bridgeport, Conn., urged co-operation with the new share-the-work movement being conducted by the rehabilitation committee, headed by Walter C. Teagle, stating that while it was difficult for the machine tool industry to do much with a 10 to 20 per cent operating rate, the problem of unemployment was great, one of the most serious in the country, and that every effort should be made by individual members to provide more work by shorter hours and spreading the available work over as great a number as possible.

A resolution submitted by W. A. Viall, vice president, Brown & Sharpe Mfg. Co., Providence, R. I., endorsing the share of the work movement was unanimously adopted.

J. Wallace Carrel, vice president and general manager, Lodge & Shipley Machine Tool Co., Cincinnati, reporting for the standard agency contract committee, stated the proposed contracts would be mailed to members at once. He outlined the work of the committee and differences, still pending with the machine tool dealers, but stated that it was generally agreed that on attachments bought within one year after the original sale, the dealer was entitled to the commission.

F. A. Geier, president, Cincinnati Milling Machine Co., Cincinnati, and F. H. Chapin, president, National Acme Co., Cleveland, both of whom toured Europe during the summer, gave interesting details of their observations. Mr. Geier ventured the opinion that both Germany and England in doing a large part of the Russian five-year machinery program would acquire broad experience with which the American builder for export trade would in the future have to deal. Mr. Chapin told of the raid on the gold reserves of the country on the part of French financial leaders, stating that the American bankers met the strain and insisted that the French take the full amount called, despite the fact that when the raid appeared to be fruitless, the French were ready to retreat.

Machine tool dealers generally have followed the advanced methods of the builders with closer attention to design with the result of better salesmanship, in the opinion of J. R. Vandyck, Vandyck Churchill Co., who discussed closer co-operation with the manufacturers. Cost of selling machine equipment is too high, and it is the paramount duty of the agent to guard the interest of his own manufacturer and not add to the already high overhead in the cost of distribution.

Sanctions Time Sales

Time or installment selling of machine tools is a logical procedure in many instances, according to E. P. Blanchard, sales manager, Bullard Co., Bridgeport, Conn., a machine tool being a capital investment with an earning power with such earnings to be planned for payment. Study of the market of the product for which the machine is purchased to produce should be complete enough to insure an earning sufficient to cover payments. The buyer in most cases knows better if the equipment can earn its way toward this ultimate profit.

On the other hand the builder should make large enough initial payment to take care of the financial and carrying risk. Time sales problem, according to Mr. Blanchard, resolves itself to uncertainity in financing. On standard tools from 20 to 33 1/3 per cent cash payment was mentioned as first payment, preferably the latter figure especially on special tools, probably the higher figure or more on units in which have been built special features which have little sales value to be marketed in other directions. The bulk of time sales are likely to cover two years, in some instances three, although the trend is toward the shorter time.

No Stigma in Acceptances

Col. L. S. Horner, chairman of the Connecticut section of the National Industrial Committee on Rehabilitation, prepared a paper on trade acceptances, outlining the Bullard company's policy on trade acceptances, stating that the practice would prove a benefit to the smaller manufacturer and that some of the largest concerns in the country advocated and place the method in practice. There was no stigma to the policy and the movement was generally accepted and favored by the more progressive banks, the acceptances being a desirable type of commercial paper. Many of the smaller bankers, however, appear not to be in sympathy with the policy. He stated 95 per cent of all trade acceptances were paid on maturity and that banking co-operation was important.

Harry Barney, Barney Machinery Co., Pittsburgh, spoke on selling machine tools, 1907-1932, giving many humorous details of the early days. He told of changed selling methods, stating that in the old days the buyer did most of the thinking. He drew a picture of the great changes brought about by the use of new and improved steels, intricate design and additional knowledge on the part of the buyer which has resulted in the machinery salesman being forced to keep pace with the times. He stated today engineering service was now a tremendous factor in selling expense and that responsibility in the selling of equipment rested with the seller, not with the buyer.

To Dismantle Soho Furnace

Jones & Laughlin Steel Corp., Pittsburgh, will demolish its Soho bast furnace and dismantle the furnace's auxiliary group of buildings and machinery. Soho furnace, at Second avenue and Brady street, Pittsburgh, on the Monongahela river, was built in 1872 and was last in blast in 1924. The move is in part necessitated by the furnace's obsolesence and by the desire to afford needed employment.

Industrial Men in the Day's News

H. Birchard Taylor, President, Diesel Engine Manufacturers' Association

SINCE graduating from the University of Pennsylvania he has been close to the shipbuilding and allied industries.

A CONNECTION made in 1915 with the Cramp interests of Philadelphia survives in Cramp-Morris Industrials.

PROMOTING diesel engine standards and collecting statistics is a large part of the association's program.

H BIRCHARD TAYLOR, who as announced in the Aug. 15 issue of STEEL is president of the Diesel Engine Manufacturers' association, brings to his new post a long experience in the shipbuilding and allied industries.

Following his graduation from the University of Pennsylvania in 1905, he entered the drafting room of the hydraulic department of the I. P. Morris Co., Philadelphia. Six years later, or in 1911, he was made hydraulic engineer of the company. In 1915 he was appointed assistant to the president of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, being made a vice president in 1917 and so continuing until Cramps discontinued shipbuilding in 1927. At that time he was elected president of Cramp-Morris Industrials Inc.

Paralleling these activities, Mr. Taylor has been president of the De La Vergne Machine Co., the Federal Steel Foundry Co., the Atlantic Coast Shipbuilders association, vice president and a member of the council of the American Society of Mechanical Engineers, and consulting engineer of the Baldwin Locomotive Works.

Mr. Taylor is devoting a considerable proportion of his time to the active management of the Diesel Engine Manufacturers association, which was organized in 1928 and has since been active in promoting trade standards in the industry and in gathering diesel engine data.

HARRY C. O'BRIEN, formerly assistant district manager of sales in the Pittsburgh district sales office of the American Sheet & Tin Plate Co., Pittsburgh, has been named manager of sales in that district, succeeding the late Joseph R. Bates. Mr. O'Brien has been with the American Sheet & Tin Plate Co. since 1904 and has been identified with the sales department since 1907.

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James A. Farrell, former president, United States Steel Corp. delivered a lecture at Princeton university Oct. 11 on "The Steel Industry."

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Jonathan Jones, chief engineer, McClintic-Marshall Corp., Bethlehem, Pa., is scheduled to deliver a lecture at Princeton university April 11, 1933, on "Modern Trends in the Construction of Steel Bridges."

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J. E. McFate, formerly associated with Jones & Laughlin Steel Corp., at Detroit, has been appointed a sales representative of Republic Steel Corp., Youngstown, O., in the New England territory. Mr. McFate's headquarters will be in Boston.

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John A. Coakley, general traffic manager, United States Steel Corp., will be honored at a dinner for over 300 guests at the Duquesne club, Pittsburgh, Oct. 18.

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R. H. Garrison, for 10 years sales manager of the Universal Motors Co., Oshkosh, Wis., has resigned to become vice-president in charge of sales of the Marble-Card Electric Co., Gladstone, Mich., manufacturing a diversified line of electrical products.

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William J. Conway has been appointed Philadelphia district sales agent for the Steel Union Co. Inc., 75 West street, New York, where he will make his headquarters. His territory comprises the southern portion of New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, and Virginia. Mr. Conway has been affiliated with the steel industry for 16 years, with F. R. Phillips & Sons Co. and later as a partner in the Conway-Long Steel Co., both of Philadelphia. The Steel Union Co. is American representative of United Steel Works Corp., Duesseldorf, Germany.

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A. M. Barrett, for many years prominent in the materials handling industry, has reassumed control of the Barrett-Cravens Co., manufacturer of lift trucks, skids, portable elevators and structural steel storage racks, which is moving into its own plant at 3255 West Thirtieth street, Chicago.

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James D. Cunningham, president, Republic Flow Meters Co., Chicago, has been made chairman of the committee on industrial rehabilitation

for the Seventh Federal Reserve district.

Gen. Otto H. Falk, chairman of the Allis-Chalmers Mfg. Co., Milwaukee, is vice chairman.

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Charles M. Schwab, chairman, Bethlehem Steel Corp., sailed Oct. 11 for England, where he will be awarded the Melchette medal for distinguished achievement in industry by the Institute of Fuel of Great Britain, which will be in annual session.

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Wayne T. Cox, formerly with the sales department of the Faitoute Iron & Steel Co., Newark, N. J., has joined the sales organization of David H. Smith & Sons Inc., Brooklyn, N. Y., being assigned to the New Jersey sales staff of the Smith company.

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Sam T. Johnston, for many years vice president of the S. Obermayer Co., Chicago, manufacturer of foundry supplies, retired from active service with that company Sept. 15, although retaining his interest in it. He continues as president of the Standard Sand & Machine Co., also of Chicago. A native of Scotland, Mr. Johnston came to this country in 1889. His first connection was with the Detroit Car Wheel Co., of which J. H. Whiting was superintendent. When Mr. Whiting organized the Detroit Foundry Equipment Co. Mr. Johnston went with him as salesman, and when the Whiting Foundry Equipment Co., now the Whiting Corp., was organized he became associated with that company. Later Mr. Johnston became connected with the Obermayer company. Mr. Johnston has been active in the American Foundrymen's association, being a charter member; he was first president of the Foundry Supply association, and was president of the Foundry Equipment Manufacturers association in 1926.

Will Establish Official Auto Scrapping Yards

New York—To accelerate scrapping used cars, member automobile builders have authorized the National Automobile Chamber of Commerce to establish official salvage yards in various districts where dealers can dispose of wornout cars, and obtain demolition certificates which they can cash with their respective builders.

While no standard arrangement has been made between builders and dealers as to cash allowance, the number of cars dealers will find profitable to scrap will have a direct relationship to the number of new cars they sell. Ford, the principal builder outside the chamber body, is expected to continue his own scrapping plan.

Obituaries

FREDERICK G. PLATT, 84, retired president of the New Britain Machine Co., New Britain, Conn., died Oct. 9. Born in Middlebury, Conn., he settled in New Britain in 1871. He reorganized the Case Machine Co., into the New Britain Machine Co., and was its president for 30 years. He was a director of the Stanley Works; Landers, Frary & Clark, and the Stanley Rule & Levelling Co.

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George Kinsey, 84, for many years head of the George Kinsey Steel Co., Cincinnati, died Oct. 12.

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Charles Shartle, 70, one of the Founders of the Shartle Bros. Machine Co., Middletown, O., died at Elkhorn, Wis., Sept. 21.

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H. J. Florey, vice president and general manager, C. B. Porter & Co., Philadelphia, metal fabricators, died in that city, Oct. 9.

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Frank O. Kichline, 57, metallurgist and engineer of tests at the Lebanon, Pa., plant of the Bethlehem Steel Co., died at his home in Lebanon, Oct. 11.

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John Trix, 83, president and founder of the American Injector Co., a charter member of the Detroit Employers' association and at one time vice president of the Steere Engineering Co., died at Algonac, Mich., Sept. 26.

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C. A. W. Vollrath, 73, president of the Vollrath Co., Sheboygan, Wis., pioneer manufacturer of enameled steel and cast iron wares, died Oct. 7. At 15 he entered the Vollrath plant, founded by his father, Jacob J. Vollrath. Mr. Vollrath was noted for his charities and philanthropies.

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A. H. Thorn, manager of industrial relations for the Peoples Gas Light & Coke Co., Chicago, died of a heart attack Oct. 11 in Atlantic City, N. J., where he was attending the convention of the American Gas association. Mr. Thorn, who was 55 years old, had been identified with the company for 38 years.

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Fred G. Walker, supervising engineer and director of the National Screw & Mfg. Co., Cleveland, died Oct. 6. For many years he was associated with the contracting firm of D. C. Griese & Walker Co., leaving it in 1914 to become identified with the National Screw & Mfg. Co. He was 64.

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George F. Root, 61, president and treasurer of Root, Neal & Co., machinery dealers, Buffalo, died Oct. 6. Mr. Root, also president of the Buffalo Apparatus Co. for 30 years, was engaged in the manufacture and sale of machinery, factory equipment and mill supplies.

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John A. Engle, 74, for 15 years superintendent of the metal and wood pattern departments of the J. I. Case Co., Racine, Wis., died Oct. 9. He was born in Holidaysburg, Pa., Aug. 30, 1858. He was one of the first employes of the Western Electric Co. when it was established at Chicago, remaining 20 years, going to the Case works in Racine in 1912.

Protest Manganese Delay; Washington Business News

(*Concluded from Page* 12)

completing a toll bridge across the Mississippi river connecting Savanna, Ill., and Sabula, Iowa. About 45 per cent of the steel work has been completed, it is stated. Of the $190,000 loaned, orders will be placed for 1150 tons of steel and $4,000 worth of tools and equipment.

The Reconstruction Finance Corp. has asked the supreme court of the District of Columbia to dismiss the suit brought by three California taxpayers to prevent the corporation from lending $40,000,000 to the southern California water district. The money is to be used in adding to the present water facilities of lower California.

The interstate commerce commission has approved an R. F. C. loan of $3,000,000 to the Baltimore & Ohio railroad. It is estimated that $900,000 will be used for repairing and rebuilding 165 locomotives, $1,100,000 for repairing 2500 freight cars, and $1,460,000 for building 820 new steel gondolas.

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The customs bureau has ruled that one of the bands encircling each lot of cotton ties must be marked on the outside in a permanent manner to indicate the country of origin of the ties when they are imported into this country.

These cotton ties, the bureau states, are usually imported in units or lots of 30, securely held together by bands or strips of metal. The ties are sold only in such units.

It was further held by the bureau that "should any of the ties be imported in containers, packages or coverings, the containers, packages or coverings must be marked to indicate the origin of their contents."

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Boston Iron & Metal Co., Baltimore, is the successful bidder for 124 obsolete wartime ships offered by the United States Shipping board. Its bid was $1.51 per gross ton for the recoverable material, the bidder to scrap the vessels.

MIRRORS OF MOTORDOM

DETROIT

IT IS safe to predict that when the 1933 models are shown the public's concept of automobile design will be revolutionized. This year's Graham, Nash, Hupp and Essex terraplane have done considerable pioneering and have afforded a preview, but the mass attack upon orthodox practice is just being launched as the new models are put into production.

Price and the conservatism of individual manufacturers will be governing factors, of course, but a tendency toward streamlining is cutting across the entire industry. Amplifying the forecast made in the Oct. 3 issue, the goal of automotive engineers is to decrease resistance to wind pressure, and hence make for more economical operation, especially at high speeds.

Probably only a few manufacturers will go the full length in 1933, but the trend will be unmistakable. In general, radiator shells which will be of the V-type with a distinct slope toward the bottom in order to scoop up the air and ease it along with a minimum of friction. Exterior visors have gone forever and more than one model will feature a divided windshield, carrying out the design of the radiator shell.

Kill Drag of Vacuum

Viewed from the front, the new bodies will have their maximum width just below the belt or molding and approximately at the rear of the front seat. This not only minimizes air resistance but also supplies room where most needed. As the bodies rise, over the shoulders of passengers, they will curve gently inward to a rounded roof line. With curved rear quarters, the vacuum which imposes so pronounced a drag at 40 miles an hour or faster will vanish.

Fenders will be so curved as to prevent the formation of air pockets and will enclose the wheels, effectually masking the undergear. Some manufacturers will completely divorce fenders and running boards; in fact, with a tendency toward a lower center of gravity the running board may disappear, although not in 1933. Tires will be mostly low pressure super-balloons, necessitating a redesign of steering gear to provide needed additional leverage.

Wheels Smaller, of Steel

What is left of wheels will be steel; wood is passing out rapidly. Once more the disk wheel is finding favor, one manufacturer offering a disk with steel spokes standing out in relief. Wire wheels still have their adherents, and on some models large steel spokes will be standard.

The spare tire mounted in fender wells or at the rear does not fit into the new design. Some models will carry spares in a rear deck; others may utilize the space in the drop fender just forward of the rear wheel. One manufacturer of chromium-plated tire covers is preparing for the disappearance of his market in two years.

Another adjustment which the public must make is in treads. There was a time when 56½ inches was considered standard, this being an adoption of the standard railroad gage, but the variation on passenger cars, trucks and buses today is from 40 to 77 inches. With 90 per cent of all driving done on hard surface roads, it is claimed there is no necessity to make car widths fit ruts.

The rear tread of the Essex terraplane is 54½ inches and the front 53. In educating the public to a slightly narrower car, Essex points to the fact that its center of gravity is only 18¼ inches from the road, whereas the average is 23 inches. For the average large car to have the same relative stability as the terraplane, a 68½ inch tread would be necessary, it is maintained.

A number of medium price cars for several years have been designed with a tread narrower in the front than the rear, to facilitate turning. The new low-price Willys, like the Essex terraplane, will be distinctly of the narrower type.

The Austin, incidentally, is coming back. Not only is there a greater demand for this diminutive model for light delivery purposes but the passenger line also is moving better, especially in the South where the proportion of improved highways to total mileage is less than in the East or Middle West. Operations at the Butler, Pa., assembly plant have been expanded to 300 units a week.

The net result of this pronounced shift to the streamlined or teardrop type of body will be to induce obsolescence—a term which is displeasing to the automotive industry—unfortunately at a time when an artificial sales stimulant is not needed.

Apparently there is an ample potential replacement market that requires only an improvement in general purchasing power to be released. The course of evolution, however, is inexorable and no manufacturer can afford to hold back lest his competitors reap the full advantage of the new designs.

New Bodies a Major Change

There seems to be no question that the streamlined body will take rank with the closed body, 4-wheel brakes and balloon tires as distinctive steps breaking with the past.

For steel, the aforementioned trend is entirely an asset. The teardrop body will be essentially an all-steel one, with the body and chassis a unit, of the type which was first presented by Dodge in its Victory model five years ago, and since exploited by Chrysler and now by Essex.

Steel is the one material in which engineers and artists can work to greatest advantage in designing the new types.

EDITORIAL

Share-Work Plan Deserves Support of Industry

WITH harsh winter weather only a few months away, the problems of unemployment and wages will assume greater importance than they have commanded at any previous stage of the depression. The hearts and pocketbooks of individuals, companies, and the local, state and federal governments will be taxed to the utmost to provide adequately in jobs or relief for the millions of American workers.

The position of industry in this matter is clear. Each industrial corporation has a certain capacity for employing workers that is governed by its financial condition, the amount of business being booked currently, and other factors. It cannot increase the number of man-hours of employment appreciably except as increases are justified by gains in business. In a few instances, concerns with unusually large financial reserves may find it possible and even profitable to "make work" temporarily. However, this procedure is not typical. In the main, industry can supply only the volume of employment that is justified by the orders received.

Co-operation in Share-the-Work Idea Seen as Effective Aid for 3,000,000 Idle

Therefore, industry's obligation in the present emergency is to see that the work now available is distributed to the best advantage. That also is the objective of the national committee to further employment, which is headed by Walter C. Teagle, president of the Standard Oil Co. of New Jersey. Experts believe that intelligent rationing of the national pool of available work hours may result in employment for about 3,000,0000 persons now idle.

Excellent examples of the effectiveness of work-sharing policies can be found in the iron, steel and metalworking industries. United States Steel Corp. in 1930 adopted a plan of alternating work among many of its employes. The annual report of the corporation for 1931 showed that in spite of the fact that operations during the year averaged only 38 per cent of capacity, the average number of workers employed was 84 per cent of the full normal working force (number of employes required to operate all departments at practically full capacity).

Another illustration is afforded by the experience of the Bethlehem Steel Corp. In an address by J. M. Larkin, abstracted on page 15 of last week's issue of STEEL, Bethlehem's plan of distributing work was shown to have resulted in holding jobs for 20,000 men. Mr. Larkin made this significant statement: "Though our operations dropped nearly 90 per cent, the actual dismissal of persons whom we would have retained had business permitted amounted to not more than 15 per cent of our total force."

Relief Burden of Winter Will Be Lessened, Business Recovery Stimulated

Similar work-sharing plans have been adopted by many other steel companies and by numerous machinery and equipment manufacturers. However, there are still employers who have not gone as far as they might in distributing employment. Here and there may be found industrial executives who say that in certain types of shops where specialized duties are common, it is difficult to spread or rotate work. Also it is pointed out that operations in many plants are below a level which permits job-sharing on a practical basis. For instance, Bethlehem officials believe it is impossible to maintain a complete normal force even on part time after production drops below 30 per cent of capacity.

These and other limitations must be recognized. To spread work out too thinly would defeat the purpose of the share-work campaign. But if every employer will study his own problem carefully, he will find ways of adding at least a few workers to his payroll through broader distribution.

No reasonable effort in this direction should be spared. Industry is fully justified by motives of enlightened self-interest to get behind this movement with all the strength at its command. In many cases men put to work by job-sharing are men who otherwise would have to be carried through the winter on relief funds. A large share of relief money is derived directly from industry.

But a more important phase of industry's self-interest is the stimulus to business recovery that will come from rising employment. Of the several movements under way for reconstruction, none has more possibilities for immediate, practical results than the share-work campaign.

THE BUSINESS TREND

Gains in September Were Better Than Expected

WHILE the record of industry for September is distinctly favorable, that fact seems to have made little impression on business sentiment. Uncertainty and hesitancy in committments are general in spite of recorded gains that are greater than anything witnessed in many months.

Steel ingot output in September was up 21.6 per cent over August. Pig iron production increased 16.2 per cent. Average weekly carloadings in the ninth month were 11.5 per cent in excess of those in August. Unfilled orders of the United States Steel Corp. as of Sept. 30 were slightly higher than those reported a month earlier. The monthly commodity price index also showed a moderate rise.

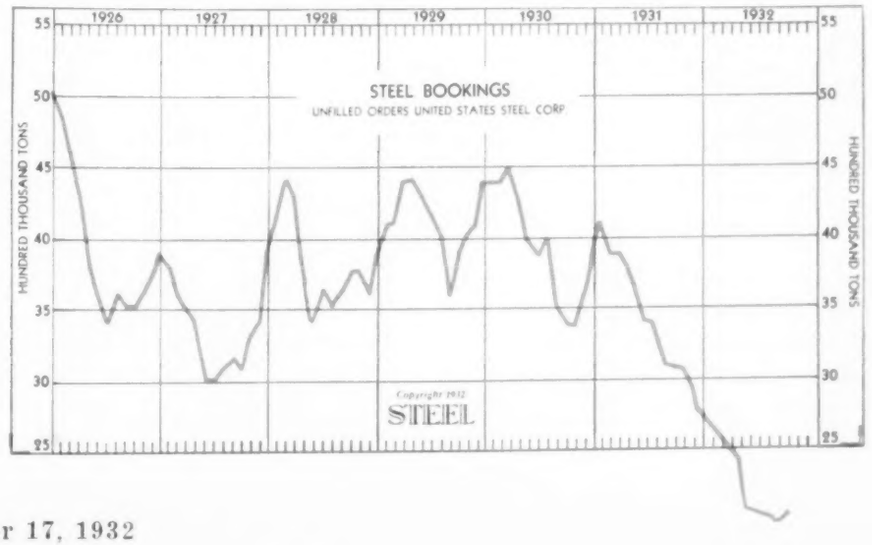
Employment in the manufacturing industries also is displaying a reversal from the long downward trend. In 1930 and 1931 industrial employment slipped steadily downward, except for a rise in the first quarter of 1931. In 1932 a slight resistance to the decline was registered in February, after which the index dropped steadily and almost uniformly to a low point in July. In August—contrary to the experience in 1930 and 1931—the index turned upward.

On the basis of the record of industry, sentiment should be better than at any time since early in 1931. Yet today the business world is more nervous than it was three months ago when industrial activity still was receding. Part of the present uncertainty may be charged to the political situation, but even after making due allowance for this factor, it would seem that present conditions justify a more cheerful tone than is now apparent.

Many Companies Still Are Reluctant To Make Committments

It is common knowledge that numerous companies that a few weeks ago were confidently contemplating modest purchases now are reluctant to place orders. There is a widespread tendency to withhold action. If only a fraction of the business held back by this timidity could be released, industrial activity would be measurably increased.

Fortunately slight gains continue to be recorded in spite of the prevailing caution. Much of the support for this improvement is coming from small, independent orders. This is more gratifying than if the impetus were being supplied from one or two concentrated sources.

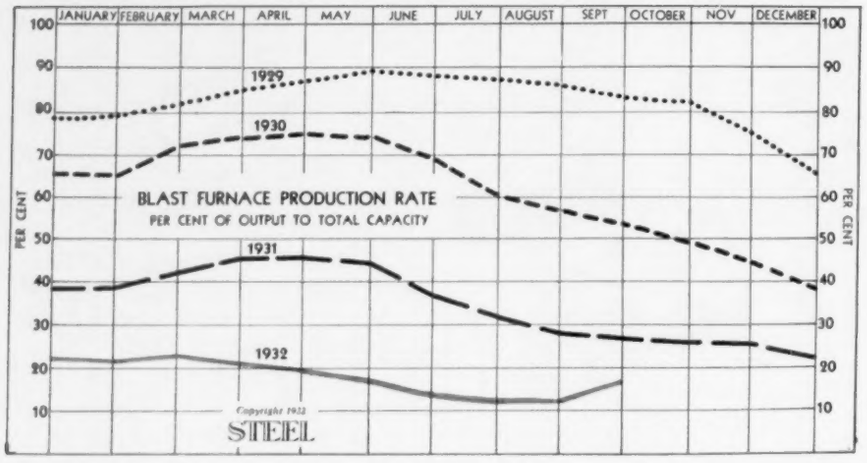


1932
Million Tons

Sept.	1,985
Aug.	1,969
July	1,966
June	2,034

1931
Million Tons

Sept.	3,144
Aug.	3,169
July	3,404
June	3,749



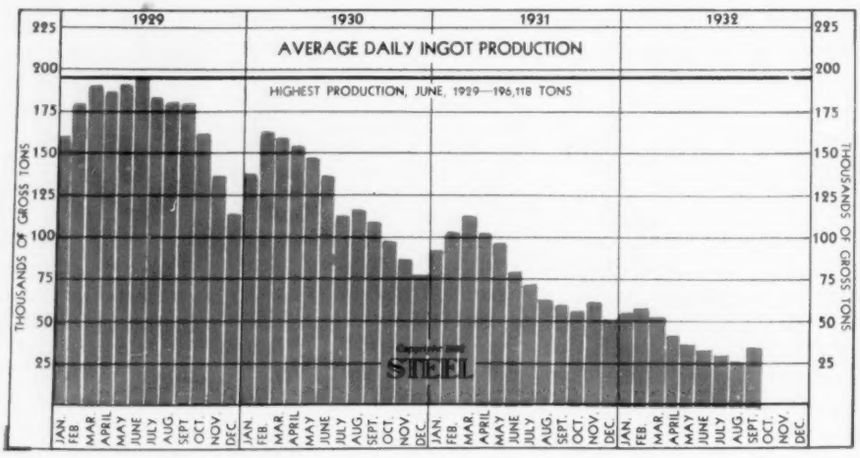
	1932	1931
	Per Cent	
September	14.0	27.0
August	12.0	28.7
July	13.0	32.7

Blast Furnace Activity Revived As Five Stacks Are Added

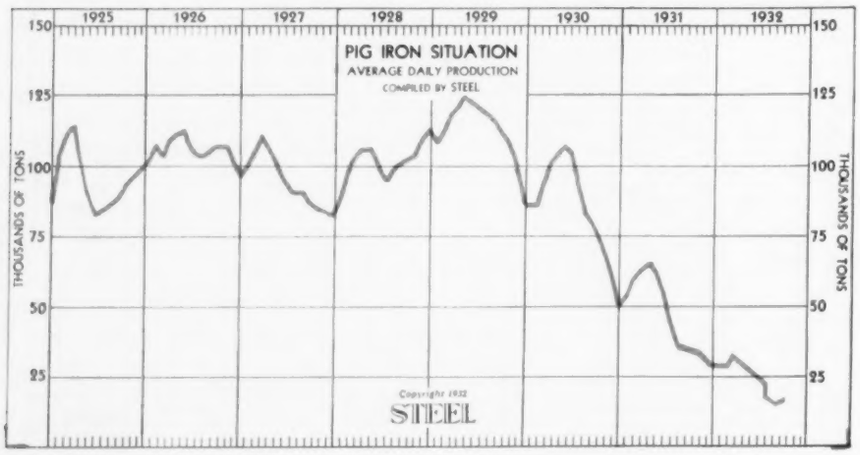
With the current rise of pig iron production, blast furnace activity took on new life with a gain of two points. Relating production to capacity, the operating rate for September was 14 per cent, compared with 12 per cent in August and 13 per cent in July. On the last day of September, 46 blast furnaces were in operation, five more than on Aug. 31. The current figure marks the first increase in active stacks since February.

Steel Ingot Rate Gains 21.6 Per Cent in September

The long decline in the production of steel ingots came to an abrupt conclusion when September registered a gain of 21.6 per cent over the rate in August, the daily output rising from 30,830 gross tons in August to 37,502 in September. According to the American Iron and Steel institute total actual tonnage gained 142,659 tons in September over the preceding month while the per cent of operation stepped up from 14.26 to 17.34 per cent.



	1932	1931
September	37,502	59,439
August	30,830	66,032
July	31,701	72,599



	1932	1931
September	19,788	38,947
August	17,035	41,264
July	18,394	47,170

September Pig Iron Output Checks Long Downward Slump

After slumping to the lowest level in 30 years, the average daily production rate of pig iron in September rose 16.2 per cent over the previous month. This is the first upward movement of the trend since February, 1932. The average daily output for September was 19,788 tons, a gain of 2,753 tons from the 17,035 ton daily average for August. Total production in September was 593,640 tons, compared with 528,105 tons in August.

RAPID EROSION TESTS CLARIFY WEAR OF METALS

BY T. F. HENGSTENBERG
Research Laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Fig. 1—Specimen mounted in impeller disk, about to pass across water jet

METAL erosion is fast becoming a problem of prime importance and is of some concern in many of the present day applications which are subjected to its destructive influence. Pitting of ship propellers and hydraulic turbine runners has long been a problem before the builders of this equipment. Steam turbine blades and airplane propellers are also subjected to the actions of erosion. Numerous investigations have been made in this country and in Europe in an effort to determine the cause of such pitting of metals.

This wearing action was first thought to be of a chemical nature, the only part attributed to erosion being that of carrying away the products of corrosion. No doubt the two actions, chemical and mechanical, aid each other, but in most cases one or the other will be the predominating factor. The present opinion is that the erosion is caused by the impingement of water drops on the fast moving parts in the case of airplane propellers and steam turbine blades and to high pressures built up due to collapsing cavities in the case of hydraulic turbines and ship propellers. The theoretical pressure built up on the surface of the metal upon impact with a drop of water has been calculated by several investigators to be from 50,000 to 70,000 pounds per square inch for a velocity of 1000 feet per second. Pressures of the order of 140,000 pounds per square inch may result from collapsing cavities of water-hammer effect.

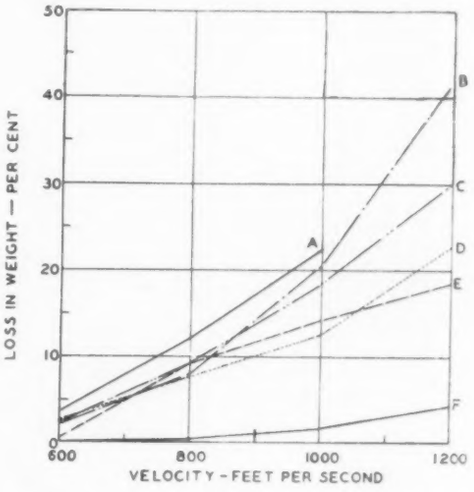


Fig. 2—Loss in weight of six specimens due to erosion after 200,000 impacts with water jet, shown as a function of velocity (see text for identification of materials)

To withstand these high pressures it is necessary that new and harder material be found. Before applying new alloys, however, some knowledge of their erosion-resisting properties should be collected. It would hardly be desirable, however, to wait until such information has been obtained from ordinary service operation; a means must be provided for rapid determination, by accelerated erosion tests, of the erosion properties and probable behavior of the various alloys when subjected to conditions similar to, but much more severe than those met in service.

Realizing the need of such research, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., decided to carry out an extensive study of the behavior of various alloys when subjected to a rapid erosion process. This article deals particularly with a description of an accelerated erosion test and some general results.

Testing apparatus consists essentially of an impeller disk into the rim of which are inserted two test pieces at diametrically opposite points. Referring to the plan

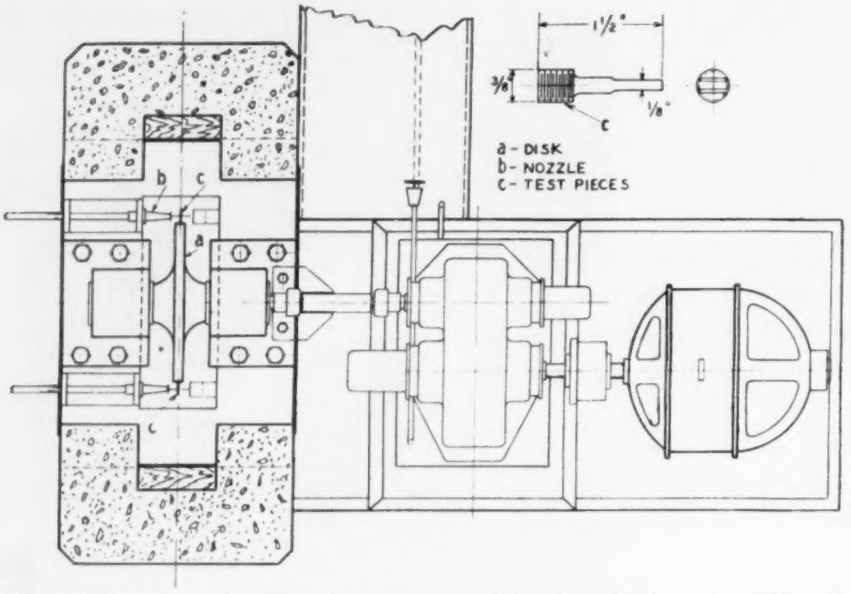


Fig. 3—Plan view of erosion testing equipment; also showing dimensions of test specimen

view in Fig. 3, the 12-inch disk (*a*) is driven at various speeds by an electric motor through a suitable step-up gear box. Nozzles (*b*) are so located that two fine jets of water, parallel to the impeller shaft, cross the path of the test pieces (*c*) approximately 1 inch away from the rim of the disk. Thus, each specimen strikes an unbroken jet of water twice per revolution. The water is used at ordinary supply line pressure and the velocity of the jet is determined by measuring the quantity of water in a given time. The disk, which is dynamically balanced, is mounted on ball bearings and revolves at 20,000 revolutions per minute for the maximum peripheral speed of 1200 feet per second. Fig. 1 is a close-up view showing the arrangement of the impeller and nozzles. Fig. 4 shows the complete testing unit with a heavy concrete hood over the disk. During a test the end openings are closed with wood covers which serve to deaden the sound.

Years' Effect in Few Minutes

Test specimens are machined from ⅜-inch cylindrical rods to the form shown in Fig. 3. By having a rectangular section at the end exposed to erosion the impact area remains approximately constant as the erosion progresses into the specimen. During a test, the narrow edge of the rectangular section is the leading edge, that is, the edge that strikes the water jet. By this method conditions differ from most applications in that the test is much more severe. The erosion produced in a few minutes of test represents several years of the average operating conditions.

Although the test does not exactly simulate the conditions to which most machine parts are exposed, the erosion produced is similar in appearance to eroded surfaces in practice. Also the agreement of test results with actual observations in the field is so close that the opinion is held that the test results may be applied to selecting materials for machine parts which are subjected to erosion. The relative merits of various materials from an erosion standpoint are practically the same whether the conditions are severe or not. Tests of this type are particularly well adapted for studying the effects of velocity on the rate of erosion as the former can be controlled accurately. The velocity of the water under line pressure is so small compared to the peripheral velocity that it may be neglected, the latter being from 10 to 20 times larger.

Some Typical Test Results

To show the effect of the velocity on erosion a number of materials were subjected to 200,000 impacts at various velocities ranging from 600 feet per second to 1200 feet per second. The following is a list of some of the materials used with their markings by which they will be referred to throughout this article:

Mark	Material	Hardness (V.P.N.)
A	Plain carbon (0.40 per cent) steel	145
B	2.20 per cent nickel, 12.0 per cent chromium steel	204
C	0.10 per cent nickel, 12.0 per cent chromium steel	258
D	Nickel steel	248
E	8.0 per cent nickel, 20.0 per cent chromium steel	260
F	Case hardened (nitrided) steel	.....

The test procedure is first to weigh the specimens accurately on a chemical balance before inserting two pieces of one material in the disk. The disk is then brought up to the desired speed, after which the water valve is opened. After a run of 1 or 2 minutes the specimens are removed and examined both for appearance and loss of weight. The specimens then are replaced in the disk and run for another short interval after which they are weighed again. By examining the specimens in short intervals the rate of erosion and the effect of the eroded notch can be studied.

Fig. 5 shows the erosion produced

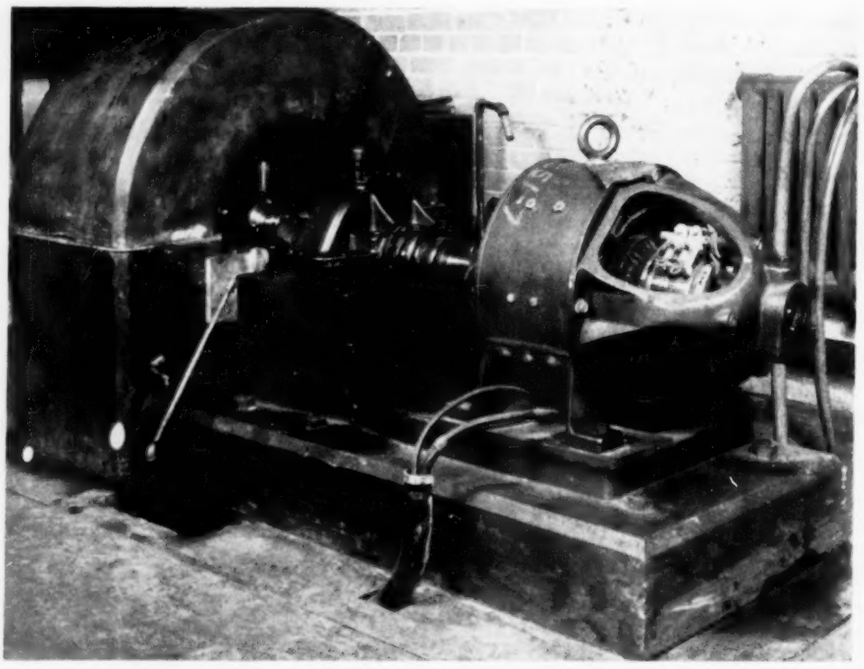
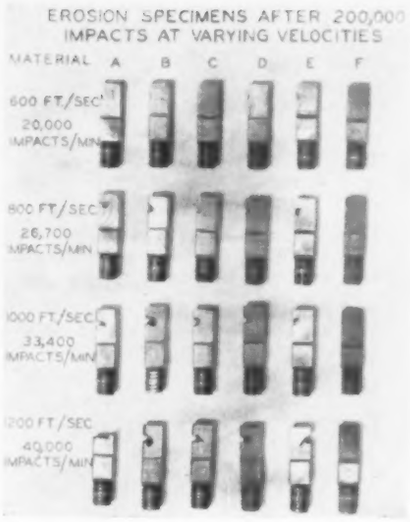
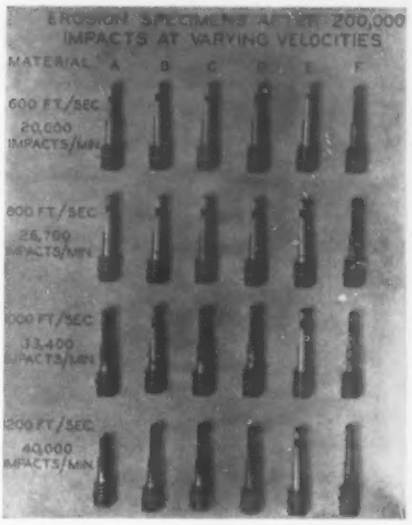


Fig. 4—Complete erosion testing unit as it appears in operation. A heavy concrete hood has been placed over the rotating disk

on the six different materials after each had received 200,000 impacts with the water jet at velocities of 600, 800, 1000 and 1200 feet per second. One exception to the above is material *A* at 1200 feet per second This specimen was completely cut off after 120,000 impacts. The side view of the specimens looking parallel to and in the direction of the water jet is of interest to note the path of the erosion notch at the higher speeds. The notch seems to have taken a downward path in some specimens and an upward path in others. Specimen *E* at 1200 feet per second is of particular interest in that the notch has a marked deviation downward on the side shown while on the opposite side the notch has taken an upward path. A probable explanation for this peculiar behavior is that the internal characteristics of the material, such as orientation and arrangement of the crystals or grain boundaries, may be the main factors which influence the path of erosion.


EROSION SPECIMENS AFTER 200,000 IMPACTS AT VARYING VELOCITIES
MATERIAL A B C D E F
600 FT./SEC. 20,000 IMPACTS/MIN.
800 FT./SEC. 26,700 IMPACTS/MIN.
1000 FT./SEC. 33,400 IMPACTS/MIN.
1200 FT./SEC. 40,000 IMPACTS/MIN.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600 FT./SEC. 20,000 IMPACTS/MIN.
800 FT./SEC. 26,700 IMPACTS/MIN.
1000 FT./SEC. 33,400 IMPACTS/MIN.
1200 FT./SEC. 40,000 IMPACTS/MIN.

Fig. 5—Side and end views of six different specimens after being subjected to 200,000 impacts at varying velocities. Effects of erosion are plainly indicated, specimen A having been completely cut off at a velocity of 1200 feet per second

Effect of Spray Noticed

At the right of Fig. 5, a view looking directly at the leading edge of the specimens, an important factor in erosion testing is brought out, namely, the effect of the fine water spray on the material. The test specimens cutting through the water jets so rapidly form a spray of water around each nozzle which attacks the whole edge of the specimen. At the lower speeds, 600 and 800 feet per second, the spray has had no effect on any of the materials, but at 1000 feet per second some of the metals begin to show the effect of the spray, while at 1200 feet per second the wear due to the spray has become excessive on materials *A*, *B*, *C* and *D*.

The spray erosion may show entirely different results than the jet erosion. This difference in erosion can be illustrated by refering to materials *B*, *C* and *D* at 1000 feet per second. Referring to Fig. 5 it will be noticed that the jet erosion is greatest in material *B*, yet in observing the leading edge of the same specimens, at the right, the spray erosion is quite pronounced in materials *C* and *D* while it has hardly affected *B*. Again referring to the same materials at 1200 feet per second the spray erosion is greatest in *B*.

In general, the harder materials offer the greatest resistance to erosion, but many discrepancies also arise to this rule, especially when spray erosion is considered. Referring again to Fig. 5, at 1000 feet per per second material *B* is softer (204 V.P.N.) than either *C* or *D* (258 and 248 V.P.N.), yet the latter show a great deal of spray erosion, while *B* shows just a trace at the tip. Again, materials *C* and *E* are of the same hardness yet the erosion is quite different at the higher velocities.

It is quite obvious from Fig. 5 that the erosion increases with an increase in speed. At low speeds all materials are resistant to erosion, but as the speed is increased the erosion increases more rapidly with some materials than others. The effect of speed is shown graphically in Fig. 2. These curves show the loss in weight of each material after 200,000 impacts at several velocities. Note at 600 feet per second the little difference between all materials and also at 800 feet per second with the exception of materials *A* and *F*. As the speed is increased above 800 feet per second greater and greater differences begin to show up between the various metals. At the higher speeds even the hardest materials are subjected to erosion. Even the case-hardened material F has been eroded through the hard case after 200,000 impacts at 1200 feet per second. If the test were continued beyond 200,000 impacts the soft matrix would begin to wear away rapidly. Thus the hard case tends to delay the beginning of excessive erosion.

Conclusions Based on Test

In general, all materials are subjected to erosion, but certain metals will stand up better than others as shown by rapid erosion tests. Although the test conditions are not exactly comparable with service conditions and are much more severe than most practical requirements, the results are in close agreement with the erosion observed in many cases. The effect of speed on the erosion-resisting properties of metals is shown clearly by this method of testing. Most of the materials show a definite increase in erosion with an increased velocity. Fig. 2 shows that at the low speeds, although there is some erosion, most of the materials are grouped into one class, while at the higher speeds the less resistant materials are separated from the more resistant steels. Thus at low speeds there is a greater variety of materials to choose from, while great care must be taken in selecting material for higher speed operating conditions.

Tests Made To Amplify Reinforcing Bar Data

Specifications are often made a part of the contract between a vendor and a purchaser so that the vendor will know what quality is expected and the purchaser may have tests made to determine whether he is getting what he wants. When these specifications are not definite in all respects, disagreements are likely to arise as to interpretation and methods of test.

In the past, most of the specifications for deformed concrete-reinforcement bars have not defined precisely the method of determining the area of the bar. The value for this area is used for computing the tensile properties from the load values observed during the tensile test of the bar. A study has been made at the bureau of standards, Washington, of four methods of area determination now in more or less general use, to find out which method is most suitable. The results showed that the nominal area was most convenient for specification work and should be used if it were considered sufficiently accurate. Further, the weight-length method was more suitable for this use than either the immersion, micrometer, or planimeter method.

Improving Open-Hearth Furnace Design

By WILLIAM C. BUELL JR.

Part I—Bottoms

TWO assumptions are made in computing the heat flow and temperature gradients through open-hearth furnace bottoms, namely, the temperature of the surrounding atmosphere which is taken at 100 degrees Fahr., and that of the steel in contact with the ground magnesite. This latter is taken at 2900 degrees Fahr., as representing the probable minimum tapping temperature of low-carbon steel made in tonnage furnaces. This figure may be somewhat lower with high-carbon steel and higher with ingot iron but 100 degrees either way would make no material change in the figures under consideration.

The value used for the heat flow through the ground magnesite is that commonly given for this material. The actual value probably is much higher, because in making a new bottom, iron oxide or even steel turnings frequently are used as a sintering medium and later the bottom is washed with molten slag and still later with a wash heat of steel; the ground magnesite hearth, therefore, actually may consist of a compound of magnesite, scale, slag and steel, all of which will tend to increase the flow figures. However, it probably is impossible to assign a value that will be more representative of conditions as actually existing. The effect of the increase of heat transfer values through the ground magnesite is to raise the temperature throughout the entire bottom to some extent. In several cases, and, in order to determine the maximum effect of this condition, calculations were made with the ground magnesite entirely absent. In no case did the increase of temperature at the junction of the cooler surface of the bottom and the air amount to more than 150 degrees Fahr. So, it may be taken as probable that in no case will the actual increase in temperature from the contamination of the ground magnesite hearth be more than 75 degrees Fahr., at the cooler surface.

Detailed data based on the previously described method of calculation are presented in Table VI, in the "Group" reference conforming with that of Table IV. The figures under B.t.u. are the emission in that unit per square foot of bottom per hour. The "maximum temperature" is the temperature of the upper surface of the particular material at its junction with the superimposed layer of material or gas. Certain of the basic data necessary for a comparison of the properties of the several bottoms are included in Table V. Data on furnace V are omitted from the comparisons to be made, this furnace merely being included as an indication of older practice now rapidly being superseded.

From column a, it may be seen that the total thickness of the refractory bottoms of the 19 furnaces falls within the range of 30 to 44 inches. As will be explained later, a bottom having a total refractory thickness of 40 to 44 inches should meet the demands of modern practice satisfactorily.

Under column b it will be noted that the total thickness of basic material which is understood to include any combination of ground magnesite with magnesite and/or chrome brick, will fall within the limits 19 to 35 inches. It will be shown that for excellent design about 24 inches of basic material will suffice. In any event the least of these materials possible to satisfactory results should be used, because of their high coefficient of heat transfer and their high cost. The costs per square foot of bottoms under column d vary from $10.79 to $15.61.

A more effective bottom than those at present in use can be designed to cost but little above the lower figure. The data under columns d, e and f will be considered jointly, since they bear a direct relation to each other when the hotter surface of the refractory remains the same. These relations are depicted in Fig. 7. Under column g, resistance R is shown to fall between 2.0 and 3.0 in 13 cases between 3.0 and 4.0 in two cases, between 4.0 and 5.0 in three cases and over 5.0 only in the case of furnace K although furnace J, R and T approach that figure. By examination of the chart it may be seen that within 2.0 to 3.0 limits of R, the temperature of the outer surface will be within the

Table V

Principal Data on Furnace Bottom Refractories

Column	a.	b.	c.	d.	e.	f.	g.	h.
Derivation	Table II	Table VI	Table II	Table II	Table VI	Table VI	Table VI	d/f
Furnace or bottom	Total thickness refractory, inches	Total thickness basic, inches	Total thickness insulation, inches	Cost per square foot	Temperature of cooler surface, degrees Fahr.	Emitted B.t.u. per hour per sq. ft.	Combined resistance, R.	Cost per R.
A	36½	29	None	$14.21	420	1080	2.327	$6.10
C	37	24½	None	11.58	390	914	2.735	4.24
D	36	26	None	13.16	405	991	2.495	3.76
E	32½	19	None	10.79	395	938	2.61	4.13
F	37	28½	None	13.34	395	938	2.637	5.06
G	30	21	None	11.04	433	1150	2.125	5.19
H	39½	35	None	15.61	418	1068	2.29	6.82
I	36	22½	None	12.24	388	910	2.77	4.42
J	44	30½	2	14.33	310	550	4.692	3.06
K	41	28	2½	13.67	301	513	5.05	2.71
L	43	29¼	None	15.51	380	855	2.90	5.35
M	40½	29	None	14.65	383	877	2.83	5.18
N	36⅝	28	None	13.83	407	1004	2.47	5.60
O	36⅝	28	None	13.83	407	1004	2.47	5.60
Q	37½	26	None	13.43	392	920	2.687	5.00
R	39½	26	2	13.80	317	575	4.487	3.08
S	39	24	None	11.68	375	841	3.03	3.86
T	39	24	2½	11.83	305	529	4.96	2.39
U	44	24	None	12.28	347	720	3.65	3.46
V	85	25	None	19.22	240	350	8.70	2.21

limits 375 to 445 degrees Fahr. but the transmission rates will be 900 to above 1200 B.t.u. per hour.

As against this, consider the group $R = 4.0$ to 5.0. Here it will be seen that the outer surface temperatures will range 303 to 332 degrees Fahr. and the transmission values 515 to 630 B.t.u. Thus a reduction of the outer temperature from 1/5 to 1/4 will effect a saving approaching 50 per cent in terms of heat. Moreover, the proper use of refractories, while not only saving heat, will react back to the furnace laboratory where, first a flame of lower temperature will do faster work, maintaining the bath at a more uniform temperature; and, second, eliminating a "cold" bottom.

The contingent effect of varying the emission or heat flow through the bottom is shown by a direct comparison of scales D and F. It might be argued that the reduction of temperature differential through the bath from 100 to 50 degrees Fahr. by reducing the B.t.u. flow from 1000 to 500 was hardly worth while, but when it is considered that the maximum flame temperature developed is probably seldom more than 400 degrees higher than the maximum bath temperature, a reduction of temperature requirements by 50 degrees represents more than 12 per cent of the total differential. When the generally accepted law of heat transfer (by radiation) namely, that transfer will vary as the fourth power of the differential, is brought into consideration, it will be seen that only a small reduction in temperature drop through the bath will produce worth while economies.

As the total resistance R is a direct measure of the efficiency of the refractories in the bottom, so the cost per R from column g, Table V, is a

Table VI

Heat Flow and Temperature Gradients Through Bottoms

GROUP	Fore plate line	A	B	C	E	F	G	J	B.t.u.
BOTTOM A:									
Depth, inches		6	27	29	7½			Air	
Resistance $R = 2.327$									
Resistance r				1.39	0.937			3.4	1080
Temp. drop, °F		43	59	1482	998			320	
Max. temp., °F	3002	2959	2900	1418	420			100	
BOTTOM B:									
Depth, inches								Air	
Resistance $R =$									
Resistance r									
Temp. drop, °F									
Max. temp., °F			2900					100	
BOTTOM C:									
Depth, inches		6	26	24½	12½			Air	
Resistance $R = 2.735$									
Resistance r				1.175	1.56			3.15	914
Temp. drop, °F		37	47	1080	1430			290	
Max temp., °F	2984	2947	2900	1720	390			100	
BOTTOM D:									
Depth, inches		6	26	26	10			Air	
Resistance $R = 2.495$									
Resistance r				1.245	1.25			3.25	991
Temp. drop, °F		40	51	1245	1250			305	
Max. Temp., °F	2991	2951	2900	1655	405			100	
BOTTOM E:									
Depth, inches		6	27	19	13½			Air	
Resistance $R = 2.61$									
Resistance r				0.92	1.69			3.18	938
Temp. drop, °F								395	
Max. temp., °F	2987	2950	2900	2018	395			100	
BOTTOM F:									
Depth, inches		6	32	28½	7½		2	Air	
Resistance $R = 2.637$									
Resistance r				1.366	0.937		0.334	3.18	938
Temp. drop, °F		37	59	1295	890		320	295	
Max. temp., °F	2996	2959	2900	1605	715		395	100	
BOTTOM G:									
Depth, inches		6	30	21	9			Air	
Resistance $R = 2.125$									
Resistance r				1.0	1.125			3.46	1150
Temp. drop, °F		46	69	1152	1315			333	
Max. temp., °F	3015	2969	2900	1748	433			100	
BOTTOM H:									
Depth, inches		6	23	35	4½			Air	
Resistance $R = 2.29$									
Resistance r				1.76	0.53			3.36	1068
Temp. drop, °F		43	49	1890	592			318	
Max. temp., °F	2992	2949	2900	1010	419			100	
BOTTOM I:									
Depth, inches		6	30	22½	13½			Air	
Resistance $R = 2.77$									
Resistance r				1.080	1.69			3.16	910
Temp. drop, °F		36	55	980	1592			288	
Max. temp., °F	2986	2955	2900	1920	388			100	
BOTTOM J:									
Depth, inches		6	27	30½	11½	2		Air	
Resistance $R = 4.692$									
Resistance r				1.455	1.437	1.8		2.62	550
Temp. drop, °F		22	30	810	790	990		210	
Max. temp., °F	2952	2930	2900	2090	1300	310		100	
BOTTOM K:									
Depth, inches		6	26	28	7	2½	3½	Air	
Resistance $R = 5.05$									
Resistance r				1.345	0.875	2.25	0.58	2.55	513
Temp. drop, °F		21	27	690	550	1159	200	201	
Max temp., °F	2948	2927	2900	2210	1660	501	301	100	

GROUP	Fore plate line	A	B	C	E	F	G	J	B.t.u.
BOTTOM L:									
Depth, inches		6	30	29¼	13½			Air	
Resistance $R = 2.90$									
Resistance r				1.21	1.69			3.07	855
Temp. drop, °F		34	51	1055	1465			280	
Max. temp., °F	2985	2951	2900	1845	380			100	
BOTTOM M:									
Depth, inches		6	42	29	11½			Air	
Resistance $R = 2.83$									
Resistance r				1.39	1.44			3.10	877
Temp. drop, °F		35	75	1235	1282			283	
Max. temp., °F	3010	2975	2900	1665	383			100	
BOTTOM N:									
Depth, inches		6	31	28	7½		1⅛	Air	
Resistance $R = 2.47$									
Resistance r				1.345	0.937		0.188	3.27	1004
Temp. drop, °F		40	61	1350	953		190	307	
Max. temp., °F	3001	2961	2900	1550	697		407	100	
BOTTOM O:									
Depth, inches		6	31	28	7½		1⅛	Air	
Resistance $R = 2.47$									
Resistance r				1.345	0.937		0.188	3.27	1004
Temp. drop °F		40	61	1350	953		190	307	
Max. temp., °F	3001	2961	2900	1550	597		407	100	
BOTTOM P:									
Depth, inches								Air	
Resistance $R =$									
Resistance r									
Temp. drop, °F									
Max. temp., °F		2900						100	
BOTTOM Q:									
Depth, inches				26	11½			Air	
Resistance $R = 2.687$									
Resistance r				1.25	1.437			3.15	
Temp. drop, °F				1168	1340			292	
Max. temp., °F		2900		1732	392			100	
BOTTOM R:									
Depth, inches				26	11½			Air	
Resistance $R = 4.487$									
Resistance r				1.25	1.437	1.8		2.65	575
Temp. drop, °F				718	830	1035		217	
Max. temp., °F		2900		2182	1352	317		100	
BOTTOM S:									
Depth, inches				24	15			Air	
Resistance $R = 3.03$									
Resistance r				1.15	1.88			3.02	841
Temp drop, °F				955	1570			275	
Max. temp., °F		2900		1945	375			100	
BOTTOM T:									
Depth, inches				20	12½	2½		Air	
Resistance $R = 4.96$									
Resistance r				1.15	1.56	2.25		2.58	520
Temp. drop, °F				610	820	1165		235	
Max. temp., °F		2900		2290	1470	305		100	
BOTTOM U:									
Depth, inches				24	20			Air	
Resistance $R = 3.65$									
Resistance r				1.15	2.50			2.85	720
Temp. drop, °F				810	1743			247	
Max. temp., °F		2900		2090	347			100	
BOTTOM V:									
Depth, inches				25	60			Air	
Resistance $R = 8.70$									
Resistance r				1.20	7.50			2.2	350
Temp. drop, °F				340	2320			140	
Max. temp., °F		2900		2560	240			100	

direct measure of the designer's understanding of his problem and his ability to take advantage of his knowledge. A wide spread exists in the cost figures ($2.39 to $6.82). The lower costs always are found in connection with the better designed bottoms.

The foregoing examples offer an excellent exposition of the cost of empirical vs. economy of the technical, for where a technical knowledge is available and utilized, as indicated in furnaces J, K, R and T, the results stand out in sharp relief. Of the furnace bottoms analyzed, only the four just mentioned can be rated as satisfactory. Each contain insulation which explains to a considerable degree the increase in the combined resistance *R*, for under the system being used 2½ inches of insulating material adds 2.25 to *R*. It, therefore, follows that in a correctly designed bottom, the inclusion of insulation is of major import.

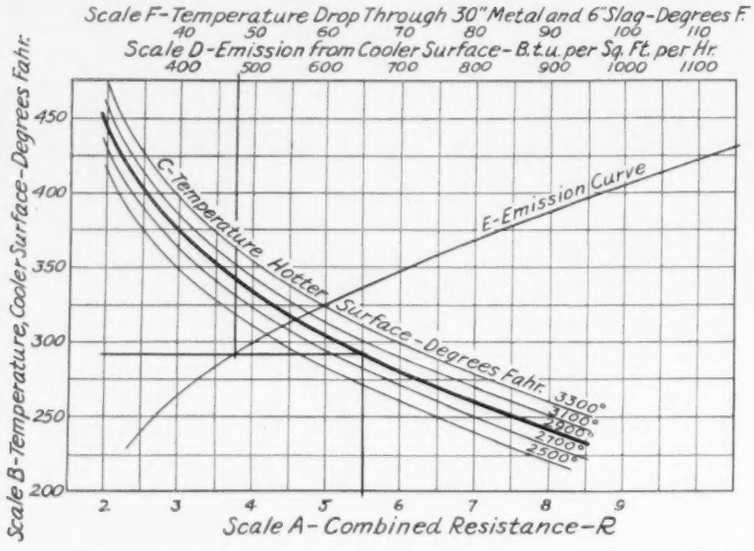

Scale F-Temperature Drop Through 30" Metal and 6" Slag-Degrees F.
40 50 60 70 80 90 100 110
Scale D-Emission from Cooler Surface-B.t.u. per Sq. Ft. per Hr.
400 500 600 700 800 900 1000 1100
Scale B-Temperature, Cooler Surface-Degrees Fahr.
450 400 350 300 250 200
C-Temperature, Hotter Surface-Degrees Fahr.
E-Emission Curve
3300°
3100°
2900°
2700°
2500°
2 3 4 5 6 7 8 9
Scale A-Combined Resistance-R

Fig. 7—Relation of bottom resistance, surface temperature, emission and differential temperature through open-hearth bath

Study of the foregoing data shows that the bottom of an open-hearth furnace should contain ground magnesite, magnesite brick and/or chrome brick, firebrick and insulation.

Ground Magnesite: This or some of the trade named compounds using ground magnesite as their base is the most suitable material available at present for basic hearths. As a basic material its relative cost is not high, but there are several disadvantages to its use, notably, its property of slaking when cold, and to the fact that its heat transfer coefficient in the pure state is high and is increased materially by the contamination of the substances used to sinter or frit the mass to homeogenity. As there is no suitable substitute in sight its use probably will continue.

An examination of Fig. 2 will disclose ground magnesite to be used in depths varying from 11 to 24½ inches, with 10 of the bottoms employing 13 inches or less, and which possibly indicates the minimum thickness of a homeogeneous mass. The best practice is to keep to the region of the least possible depth and as the addition or deduction of a few inches, to meet the operating man's idea will not materially affect its value, 15 inches minimum thickness may be assumed to form the top of the ideal hearth.

Magnesite Brick: The necessity for the use of magnesite brick as a backup material to the ground magnesite hearth is questionable. It has the disadvantage of a high first cost and high heat transfer coefficient as compared to chrome brick. In any event, proper engineering design requires a neutral material such as chrome brick to be used between the basic magnesite and the acidic fire brick. From Fig. 2 it will be seen that only the bottoms of furnace D, E, G, J, M and V omit the neutral refractory. It will also be noted that magnesite brick in thicknesses from 4½ to 12 inches is shown in 15 bottoms, but is totally absent in five bottoms. Custom or prejudice may require its use. Chrome brick is used in the ideal bottom, but if necessary magnesite brick may be substituted in part, at least, at an increase in cost.

Chrome Brick: In the past few years decided improvements have been incorporated in the manufacture of chrome brick, and its properties warrant wider use as a principal component of furnace bottoms. Other advantages of this grade refractory include a nearly neutral reaction to the acids or bases of the basic steelmaking process, a melting and softening point above that of magnesite brick, a slightly lower coefficient of heat transfer at usual temperatures, slight reaction only when in contact with the bath and a first cost of about 60 per cent of the cost of magnesite.

The purpose of the material, be it magnesite or chrome brick following the ground magnesite hearth, is to act as a secondary line of defence in case the molten metal penetrates the ground magnesite hearth and threatens to break through the bottom.

These refractories add but little to the resistance *R* of the flow of heat, they occupy valuable depth and their cost is high. These three factors bear consideration. In the furnace under study the combined depth of magnesite and chrome brick ranges from 9 to 15 inches, except in the case of furnace J, in which 6 inches of ground magnesite and cement is substituted. For the purpose of laying out an ideal bottom, a 9-inch thickness of chrome is considered to the exclusion of all magnesite brick. As previously stated, magnesite may be substituted in an equal or partial amount without a material change in the value of *R*, but with some increase in cost.

Firebrick: Table VI shows the temperature gradients through the various groups of refractories that make up the bottoms of the several furnaces. At the bottom line under column C is given a figure that represents the temperature of the C group (basic material) at the furnace bottom in contact with the following course of firebrick. Examination of this figure for the different furnaces will show that (excepting furnace V) the maximum temperature in any case (furnace T) is 2290 degrees Fahr. and in most cases is below 2000 degrees Fahr. This at once indicates that the inclusion of a firebrick of high refractoriness in a bottom is unnecessary. As a matter of fact, several designers usually indicate a second quality firebrick for this purpose, specifying a hard-burned brick. Undoubtedly, this is sound engineering. The use of second quality firebrick will reduce materially the bottom cost, especially as firebrick should be used in increasing thickness as the bath shallows.

Fig. 2 shows a depth of firebrick ranging from 4½ to 20 inches, not considering bottom V. As firebrick is a fair heat insulator at a nominal cost, maximum use should be made of it. In the original bottoms to be discussed later, the firebrick component will be used to the greatest advantage.

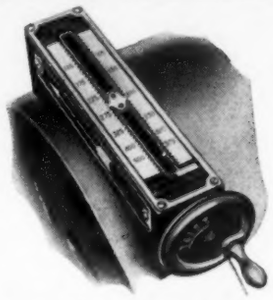
Insulation: While good engineering dictates the general use of insulation in furnace bottoms, it cannot be used indiscriminately since its improper application may lead to serious bottom difficulties. Several excellent

(*Please turn to Page* 32)

Only

America's Finest, Fastest Welder

Offers this Simplicity of Control



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Even the most minute gradations in the welding current can be obtained quickly, easily, and accurately by means of this micrometer-screw adjustment located conveniently on the commutator end of the generator housing. Turning of this screw shifts the position of both the main and the auxiliary brushes in the generator. No voltage regulation is necessary as voltage is automatically adjusted with the current in the P&H-Hansen Arc Welder. Field rheostat and knife switches are both eliminated. No other welder offers such simplicity of control with all that this means in speeding up welding and cutting its costs.

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There is only one current control in the P&H-Hansen Arc Welder. The single regulator provides all the variations in current needed for high speed, high quality welding. Voltage control is entirely automatic.

Thus the operator is relieved of much time-wasting in the selection of proper welding current. And the simplicity of the P&H-Hansen micrometer-screw adjustment makes it easier to provide the right kind of current for each job. Because you can deposit more welding metal per man-hour and per kilowatt-hour of power consumed, you'll weld for less money with the modern P&H-Hansen—America's finest, fastest welder.

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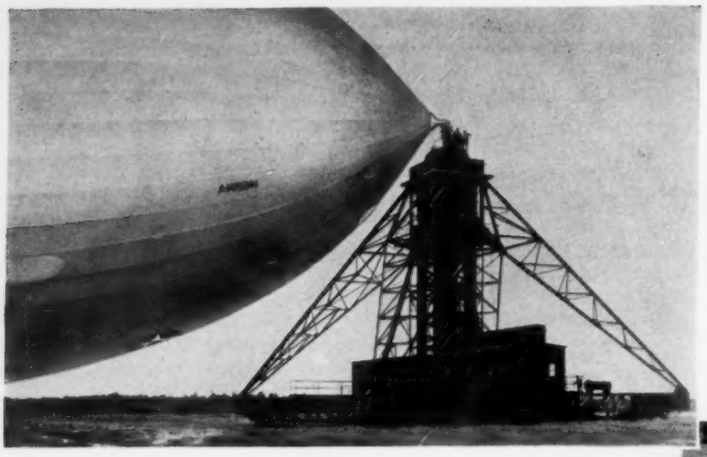
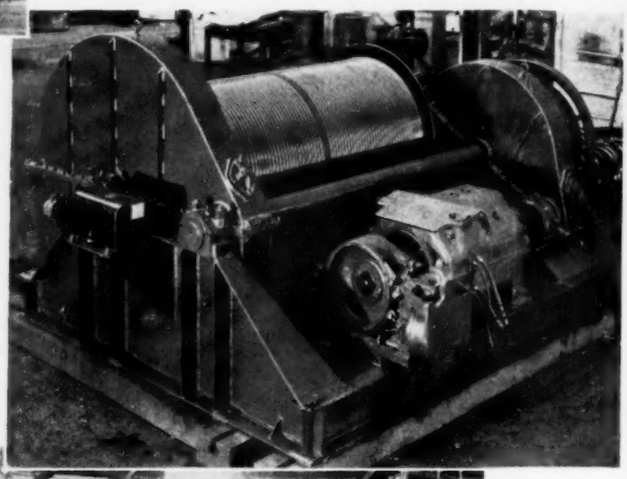
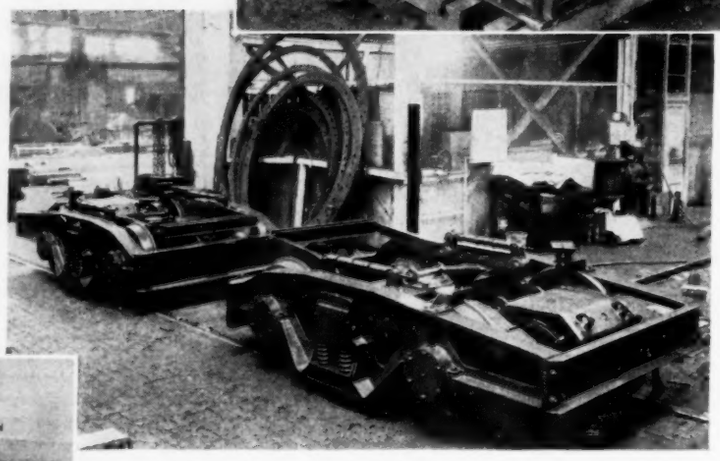


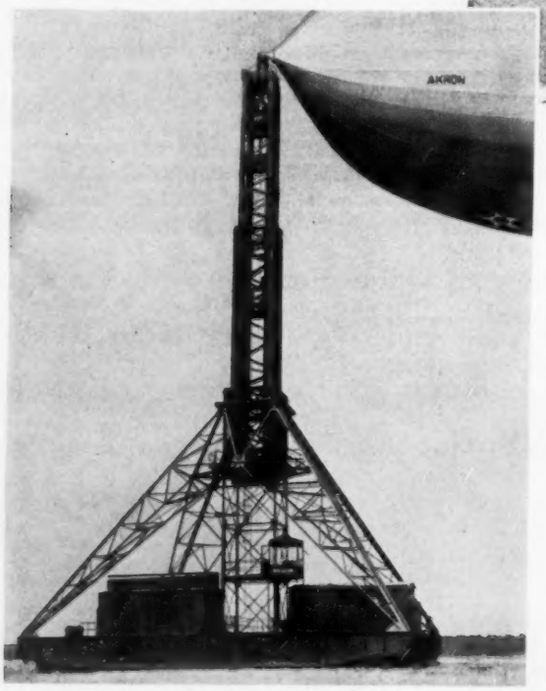
THIS telescopic mobile mooring mast, shown at the left with the mast telescoped, was installed in Lakehurst, N. J., recently for docking the AKRON *and* MACON. *It successfully passed all tests including speed, control, stability and strength. A dirigible can be moored at a maximum height of* 160 *feet and lowered to a minimum of* 75 *feet from ground level. The mast is telescoped by a wire rope system operated by the hoisting unit shown below. It will be noted that the bedplate of this hoist was fabricated by welding for welding was used extensively in construction of the mast*



Mobile Mooring Mast Presents Many New Problems

DESIGNING and constructing a telescopic mobile mooring mast for mooring and docking large dirigibles such as the AKRON and the MACON is an engineering project of no small proportions. Structures of this type pioneer a new field and requirements of service impose the most rigid specifications both as to materials and performance. Design of a mast involves a broad knowledge of power transmission, electrical control, transportation, fabrication methods and other considerations not met with in most lines of machinery manufacture.

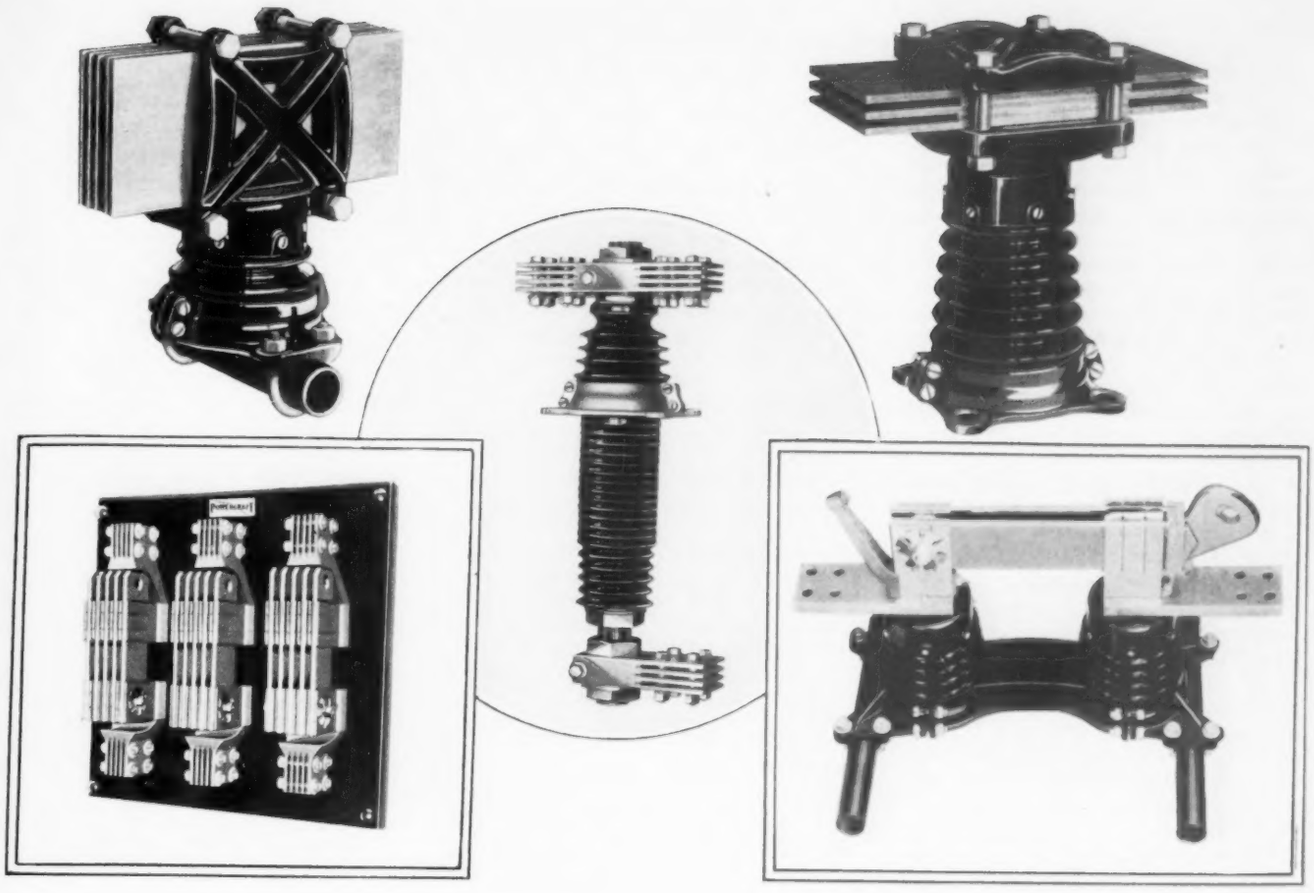




IN THE illustration at the left, the tower is shown extended to its full height of 160 *feet. The tower, having two extensible vertically traveled sections which move simultaneously, is constructed of alloy steel to afford high strength with low dead weight. Movement of the mast is accomplished through motor-driven trucks as shown above. The trucks are provided with air brakes and electrical sanding and are extremely powerful*

The accompanying illustrations show the mast which the Wellman Engineering Co., Cleveland, recently installed at the United States Naval Air station, Lakehurst, N. J.

This mast embodies a number of improvements and distinctive features based on experience acquired through use of various types of masts built heretofore. It is of the stable, self-propelling type, arranged to operate on straight and curved tracks around, and leading from, the mooring circles into the ship hangar. All machinery units for handling the various ship docking operations, such as propulsion, mast telescoping, mooring line winch, ballast and fuel pump, air compressors, etc., are



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driven by electric motors supplied with power from a gas-engine driven generating plant carried on the mast.

The machine comprises a rigidly constructed steel superstructure built in the form of a four-sided pyramid and supported by a deep base or deck made up of structural steel trusswork approximately 80 feet square.

The deck is carried by four four-wheel specially designed standard railway gage trucks. They are made up of heavy steel bolsters and side frames, are fitted with self-aligning roller bearing journal boxes, and are provided with spring clusters designed to take the heavy loads and arranged to minimize the horizontal movement of the top of the mast under high winds. Trucks are driven by individual motors carried on heavy steel axles; these being fitted with standard M. C. B. rolled steel wheels.

The machine is capable of mooring a ship at a maximum height of 160 feet above the ground and of shortening its elevation range so as to bring the nose of the ship to a minimum height of 75 feet. This is accomplished by an extensible tower comprising two separate vertically traveled sections, which are rectangular in shape, and made up of alloy steel sections.

These sections are so constructed that the top one telescopes within a series of guide rollers carried in the inside corners of the lower one; the lower section in a similar manner telescopes in a correspondingly heavier guide roller equipment mounted on the inside of a central square opening of the pyramid. All guide rollers are fitted with high-duty roller bearings, and are mounted in pairs on equalizing arms arranged to give proper alignment, adequate adjustment for wear and to restrict the working play between the projecting tower and the surfaces of the guide rollers.

Raised by Cables

The lower section of the tower is raised and lowered by a wire rope system operating over sheaves, some of which are carried by the section and others on the fixed frame. This rope reeving is operated by a hoisting unit secured to the base of the mast. This unit is protected with powerful electrical and mechanical brakes, automatic slow-down and stop switches, and is controlled from the pilot house. The upper section of the mast, supported by another rope system, is automatically raised or lowered by the corresponding vertical movement of the lower section; the entire system is arranged to cause a simultaneous travel of the individual sections.

The top of the upper expanding tower is provided with the usual mooring mechanism which consists of a conically-shaped inverted bell forming the receptacle for the mooring cone carried on the nose of airships. This bell or cup with its locking devices, cushion chamber, etc., is mounted in a rotating spindle fitted with heavy-duty antifriction bearings allowing it to rotate freely with the ship. The bell and spindle assembly, housing, etc., are resiliently mounted as a complete unit in a tube or housing carried on a gimbal ring, allowing the entire cup mechanism to tilt from its normal vertical position through a certain range of inclination in any direction from which the ship may approach the mast.

The top of the structure also carries, in addition to a circular railed platform to facilitate the ship nose locking, square platforms or decks constructed within the tower; these are protected by hand railings and are provided to freely permit the manipulation of the mooring head mechanism and to accommodate the mechanism and accessories for effecting the centering and anchoring of the mooring cup unit in its usual fixed or moored position.

Stern Beam Holds Lines

After the bow of the ship is secured to its anchorage, the subsequent docking operations to carry the ship to the hangar are conducted in co-operation with a traveling stern towing car recently built by the Wellman company and known as a "stern beam." One of the functions of this car is that of holding the ship stern lines while trailing the mast and moored ship in the low telescoped position during its trip from the mooring circle to the hangar, or vice-versa.

The mooring mast is designed to travel during that trip around track curves, ascending a 3 per cent grade against a 40 mile per hour wind, together with stern beam trailing, at speeds ranging from creeping to 2 miles per hour. The mast trucks are provided with an air brake system of ample power to lock the entire mast with airship and ship stern beam against the specified wind pressure. All driving track wheels are electrically sanded.

When the mast travels over the curved sections of the tracks the motors driving the trucks operating on the outside track are caused to run at a higher speed than those propelling the truck on the inside track; the speed differential corresponding closely to the curvature of the track; this is done automatically through adjusted electrical connections. To prevent excessive skewing and binding on the rail flanges when the mast is traveling on the curve, a set of limit switches and a squaring device are operated by the swing of the trucks. Dials are conveniently installed in full view of the operator to show him whether the structure is square on the tracks or if one side is lagging behind the other; the dials at all times accurately indicating, through automatic remote control, the actual skew of the trucks.

When mooring, a line secured to the ship and passing through the pendant cone on the ship's bow, and carrying a special coupling device on its end, is dropped to the ground. Previously the free end of a similar line on the mast has been lowered to the ground. This line leads from the mooring winch over deflecting sheaves, up through the center of the telescopic mast sections and finally through a vertical central hole in the mooring head mechanism and out at the top of the cup. The two line ends are quickly connected and the line made taut by hauling in on the mooring winch.

A further operation of the winch in the same direction pulls the ship downward and toward the mast, until the cone is firmly seated in the cup and locked in position. To aid in steadying the ship during this operation yaw winches located outside, and independent of the mast, manipulate other lines attached to the ship.

The mooring winch is of the most modern design, equipped with an efficient fairlead device, and is provided with duplicate controls so that it can be operated either directly from the pilot house or remotely by the docking officer from any point about the platform railing surrounding the mooring cup. The winch winds over 2000 feet of line, and is capable of handling a 25,000-pound pull with the line running from zero speed up to 100 feet per minute and able through a special control arrangement to handle smaller rope tension at relatively higher and greater speed ranges. The winch is made to pay out line in the reverse direction should the pull of the ship exceed a certain percentage of a predetermined maximum.

Hydraulic Brake on Winch

Graduated resistance is provided in the event of the ship pulling too fast, and in case of failure of power a breaking circuit is established to hold the pull back of the ship; the amount of braking being observed directly from a recording rope pull indicator and the ship manipulated accordingly. The rope speed can also be instantly read from a speed indicator in front of the controls. The winch is further controlled mechanically by the action of a progressively applied hydraulic brake. To insure positive and accurate line winding on the mooring winch drum an automatic rope spooling device of perfected and substantial design is employed.

The control arrangement of the various motor driven units was made to give exceedingly fine graduations in speed control from minimum to maximum load conditions. Prac-

New G-E motors and control on this drilling machine . . .

Save $5,400 to $27,000 Annually

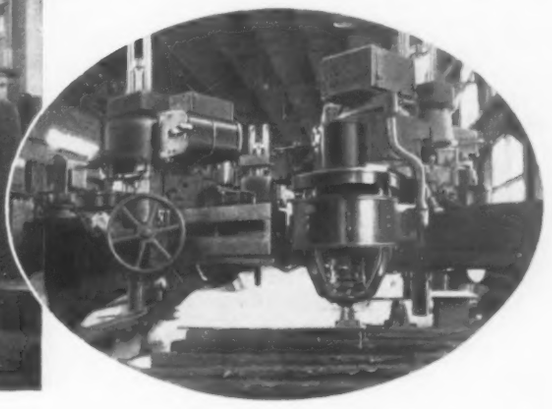
THIS machine, installed in the plant of a leading locomotive manufacturer, formerly handled drills up to $1\frac{7}{16}$ inches in diameter at spindle speeds of 70 to 300 rpm., but developments in boiler design demanded holes up to $3\frac{1}{2}$ inches. Modernization solved the problem. At a cost of $16,000, the drill heads were overhauled and new G-E motors and control were installed. The maintenance engineer says—

> "Depending on the design, each boiler unit has from 500 to 2500 $1\frac{7}{16}$- to $2\frac{1}{4}$-inch holes. Since our saving, due to modernization, averages $3.60 per hundred holes, we save from $18 to $90 per unit, or an annual saving from $5,400 to $27,000, depending on the rate of production."

Had you thought about modernizing some of your machines? Perhaps you, too, can speed up operations and save time and money by installing new G-E motors and control. A motor specialist in your nearest G-E office will be glad to talk over modernization plans with you. General Electric Company, Schenectady, New York.

IT PAYS TO MODERNIZE

The modernization of this huge drilling machine with G-E motors and control has benefited both the company and the operator. By speeding up production, it has saved the company hundreds of dollars, and by reducing the operator's unproductive time, it has enabled him to earn a better daily wage.



200-649

GENERAL ELECTRIC

tically the entire electrical equipment was furnished by the General Electric Co., Schenectady, N. Y.

The power plant consists of a Sterling high-duty 8-cylinder gasoline engine, driving through flexible couplings and mounting on the same heavy steel base, the generating units, exciter, etc., required to supply power to the various motors. It also supplies lighting and special control circuits.

The machine is stable against predetermined wind pressures, but to prevent overturning due to excessive high winds and to avoid sliding on slippery rails the corners of the deck are equipped with fastening devices adapted to engage ground anchorages.

Before final acceptance by the Navy department exhaustive tests were made including those for speed and control. To test the stability and strength of the mast at both minimum and maximum heights, side loads were applied which equalled or exceeded the maximum conditions to be met in actual service. With the mast extended to its maximum height of 160 feet, a side pull of 20 tons was applied to the top of the upper telescoping member. Similarly, when telescoped to the minimum height of 75 feet, a side pull of 30 tons was applied. In addition, a drawbar test pull of 57,000 pounds was made also.

Improving Open-Hearth Furnace Design

(*Concluded from Page* 26)

grades of insulating bricks or material are on the market and while all have high heat resisting values, in general the materials may be expected to have two inherent physical weaknesses which must be considered in their application. The first of these is the weakness under superimposed loads. It later will be shown that the insulation will be required to support loads, never less than 1500 pounds and perhaps more than 2500 pounds per square foot. This condition always must be borne in mind. The second is the possibility of disintegration or excessive shrinkage under heat, that may cause a disastrous movement in the bottom.

The use of but little insulation will cause a considerable retention of temperature in the higher components of the furnace bottom, which in turn may cause the hotter surface of the insulating material to reach a temperature exceeding its particular limit of physical resistance.

In the furnaces under study, two bottoms, those of furnaces J and R have 2 inches insulation and two, K and T, have 2½ inches. Referring to the temperature gradients in Table VI, the temperature of the hotter surface of the insulation may be found under column E as 1300 degrees for furnace J, 1660 degrees for furnace K, 1352 degrees for furnace R and 1470 degrees for furnace T. The high temperature of furnace J is the result of a following layer of 3½ inches of chrome ore.

From the foregoing figures it would appear as if the maximum allowable temperature to which insulation should be subjected might be about 1800 degrees. In the present state of the industry there are but one or two processed materials of high heat flow resisting value capable of supporting a loading of 2500 pounds per square foot at 2200 degrees, which is essential to allow a fair margin of safety. Insulation, therefore, must be applied with care and understanding. From the foregoing it may be taken that indiscriminate and empirical use of insulating material cannot be made without the possibility of dire results. In the analysis and synthesis of the various bottoms the heat flow values used are those as given for insulating brick in Table IV, and require a high-grade material. The uual run of insulating concretes have less than half the values as used.

Sand, Loam, Ore, etc.: The sparse use of these materials as a bedding for the brick above often will save much of the mason's time in leveling up the first course of brick. These materials have a heat flow resistance somewhat higher than firebrick and their judicious use is recommended.

(*To be continued*)

Two Steel Residences Completed in Cleveland; Third One Announced

INTEREST in steel residence construction was focused in Cleveland last week with the completion and opening to public inspection of two different types of structures and the announcement that a third would reach the finishing stages in a few days. Activity in the steel house field has been under way in this city for several years, with progress within the last year most intense.

What is said to be the world's first porcelain enamel steel house was formally opened for display on Oct. 9 and it will remain open to visitors for an indefinite period. This house, sponsored by the Ferro Enamel Corp., Cleveland, was designed by Charles Bacon Rowley & Associates Inc. and built by George L. Dublin Inc., also of Cleveland.

This residence in South Euclid, O., utilizes a steel frame fabricated by the Truscon Steel Co., Youngstown, O., to which is attached on the outside a ferroclad material consisting of two steel sheets separated by a 1-inch thickness of insulation board. Porcelain enamel shingles attached to a water and heat proof material and an invention of the Ferro Enamel company are attached to the ferroclad board by special steel nails.

Details of this residence were presented in the Dec. 28, 1931, Jan. 25, April 25, and Aug. 15, 1932, issues of STEEL.

On Oct. 12, Insulated Steel Inc., Cleveland, dedicated in Solon, O., a frameless steel residence which has floors of sheet steel Z-sections welded together to form a series of boxes and walls of sheet steel sections. All sheet sections are shop fabricated and the wall sections are assembled in the shop, trucked to the job and welded in position. The floors and walls of this house when erected constitute the frame of the structure.

Co-operating with Insulated Steel in the design of this house and furnishing the steel was the American Rolling Mill Co., Middletown, O. Other co-operating companies were the Westinghouse Electric & Mfg. Co., Celotex Corp., and the Libby-Owens-Ford Glass Co. Articles describing this residence in considerable detail appeared in the Jan. 25, Aug. 15 and Aug. 29, 1932, issues of STEEL.

Stimulus for Better Times

In presenting the dedicatory address, Charles R. Hook, president of the American Rolling Mill Co. stated that the new type of house offers enlarged markets to producers and fabricators of steel and that possibly the industry will look back upon the dedication of the metal house as a great business stimulant.

This house also will be open for inspection indefinitely.

Another new type of house, developed and constructed by Homes Permanesque of America, Cleveland, was announced last week as being ready for public view Oct. 23. This house in Parma Heights, O., uses a steel frame built by the Truscon Steel Co. and an exterior of asbestos in a form resembling stone. Both the frame and the asbestos exterior are fabricated in the factory and erected on the site. Members of the frame are held together with lock wedges of steel.

Co-operating with the company in the development of this home are Philo R. Brooke, architect; Truscon Steel Co.; and the Philip Carey Co.

Urge Promotion of Consumer Acceptance of Welding

SAVINGS approximating one-half billion dollars are being realized by American concerns annually in the basic cost of replacing machinery and one billion dollars in the reclamation of plant equipment as a result of the employment of various welding processes. These figures were presented at the merchandising session of the twelfth fall meeting of the American Welding society, Buffalo, Oct. 3-7, by T. C. Fetherston, manager, technical publicity department, Linde Air Products Co., New York, who spoke on "Selling Welding Products."

Consumer acceptance of welding never has been promoted as has been the case with various grades of steel, the speaker contended, and he advocated that the Welding society should use every means at its command to focus public attention on the many favorable factors of welding.

Heavy Equipment Welded

The wide application of welding in the construction of heavy mechanical equipment such as ore unloaders, open-hearth charging machines, gas producers, mooring masts, buckets, etc., was explained in detail and with lantern slides by A. E. Gibson, vice president, Wellman Engineering Co., Cleveland. Serviceability and minimum weight of the finished product were cited by the speaker as advantages afforded by welding in the manufacture of various types of heavy machinery.

Not only are savings to be encountered in the building up of heavy units by welding such as bedplates and gear reduction sets but this method of joining also will yield substantial savings in the assembly of small parts, the speaker contended. He directed attention to the expense of welding labor and emphasized the importance of designing parts to be welded along straight lines.

Welders should be classified according to the different types of equipment to be used, and to their skill or ability in operating the equipment, stated V. P. Marran, vice president in charge of sales and chief engineer, Walsh Holyoke Steam Boiler Works Inc., Holyoke, Mass. The welder then should be graded with an A, B, C or D rating, depending on the requirements of that particular industry, he contended. The ratings are awarded to operators after examination and not until they pass a further test should their grading be advanced.

Only in this way, the speaker emphasized, can a manufacturer, by qualifying his welders, hope to turn out satisfactory work that will be a credit to the art. In conclusion the speaker suggested that a time clause be placed in the qualifying code for welders so that, regardless of the skill an operator may develop in a short length of time, he will have had sufficient experience before qualifying for the next step.

Qualification tests for beginners in the art of welding cost between $50 to $100 per welder, according to A. Vogel, building engineer and architect, General Electric Co., Schenectady, N. Y., in discussing "Pre-Qualification Tests for Welders" by E. Lunn, consulting engineer, Chicago. Mr. Vogel emphasized that this cost should be reduced and explained how the adoption of certain type welds not requiring expensive machining operations for testing would attain the desired result. He also suggested the American Welding society maintain a committee on qualifications of welders and that the committee co-operate with other societies. Mr. Vogel cautioned that welders returning to work after 3 to 6 weeks idleness should be required to pass qualification tests and stressed the importance of submitting surprise tests frequently to the welding crew to insure their continued proficiency.

Chemistry of Arc Weld Metal

Inasmuch as the deposition of a thick weld by the metal arc involves the deposition of many feet of individual weld metal beads, the deposition extending over a considerable period of time and being subjected to several variations in welding conditions throughout the interval, some departure from the typical analysis may be expected in the different beads of weld metal. Attention was directed to this fact by J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, O., in discussing "The Chemistry of Low-Carbon Metal Arc Weld Metals."

Possessing the relatively high nitrogen and oxygen contents in comparison with steels of normal steelmaking practices, weld metals as materials for an investigation should offer some interesting metallurgical aspects with respect to the study of steels of abnormally high nitrogen and oxygen contents, and to the general study of the effect of these gases on the properties of steel, he concluded.

Constructing the tension members of welded roof trusses from several continuous straps, which are disposed throughout the truss so as to automatically increase the cross section of the various members in proportion to the loads they carry was offered as a sound engineering method by C. H. Jennings, research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The actual stresses in the members of such a truss, he pointed out, agree well with the theoretical stresses computed by standard methods. The secondary stresses in the various members are relatively low which the speaker attributed to the flexibility of the tension members and the joints employed. In conclusion, he emphasized that if the tension straps are not kept straight, an undesirable redistribution of stress may occur in some of the composite members.

Metal Spraying More Popular

Metal spraying is coming into wider use and in a few years may parallel the progress of welding, stated H. B. Rice, Metal Spray Co., in explaining the details of the process and applications. An allowance of 0.010 to 0.025-inch is made for machine sprayed parts. Sprayed metal is somewhat similar to cast metal, the speaker said, and in some respects may be machined in the same manner. For example, a sprayed bearing either may be machined by taking fine cuts with a small round nose tool and finished with emery, or an emery wheel may be used for the entire operation since but a few cuts are necessary to clean up the surface.

By the use of large diameter wires and a large capacity gun, machine parts may be reclaimed at a low cost. Using ⅛-inch diameter rods, which may be applied at the rate of 6 pounds per hour, the total cost including metal, oxygen, acetylene and labor, will approximate $0.50 per pound for cold rolled and high-carbon steel and $1 per pound for the various stainless steels. One pound of metal sprayed on 1 square foot area, the speaker stated, will obtain a coating approximately 0.025-inch thick.

To Meet in Chicago in 1933

Annual meeting of the American Society for Testing Materials in 1933 will be held June 26-30 at the Stevens hotel, Chicago, during the Century of Progress exposition. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary of the testing materials society.

EVERYTHING FOR

OXY-ACETYLENE

WELDING & CUTTING

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Plants and warehouses in all industrial centers make Linde Oxygen, in the familiar grey and green cylinders, available everywhere at minimum transportation cost. Users also benefit from the unique engineering facilities of Linde Process Service.

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Prest-O-Lite Dissolved Acetylene . . . the standard for well over a quarter of a century . . . is available from a Prest-O-Lite plant or warehouse near you. Prest-O-Lite is portable, convenient, economical.

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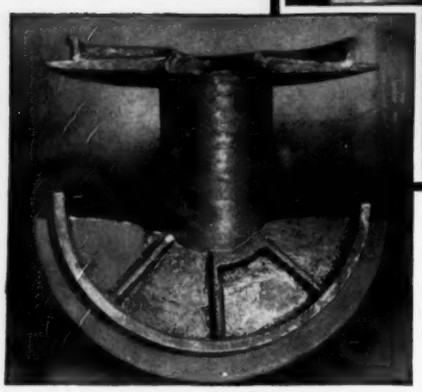
Suitable Oxweld blowpipes, regulators, welding rods and supplies are available for every operation. The Oxweld trade-mark represents maximum value in oxy-acetylene welding and cutting equipment.

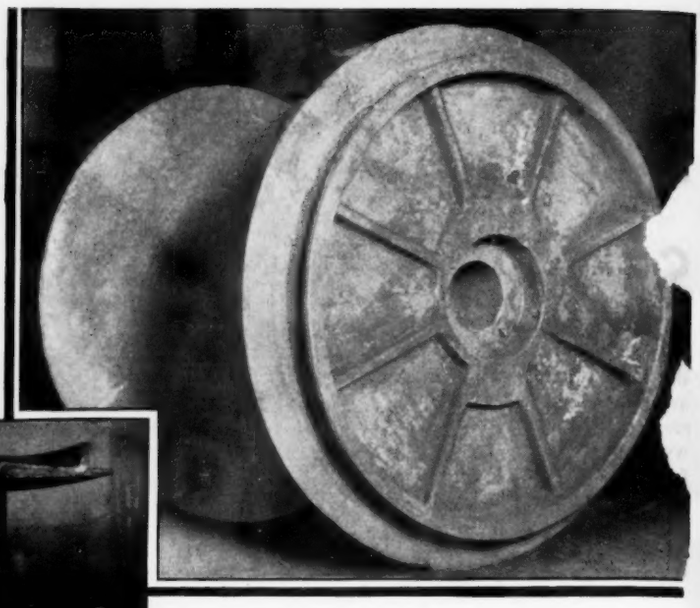
UNION CARBIDE

Careful expansion of distributing facilities has made Union Carbide available to every American industry from over 250 warehouse stocks. Sold always in the Blue and Grey drum, it has been the accepted standard for uniform high quality for more than 30 years.

This cast steel hoist drum was broken in an accident and ordinarily would have gone to the scrap heap—

but





—in a few hours, by oxy-acetylene welding it was returned to service as good as ever.

Who ever heard of scrapping dividends?

THE scrap pile isn't entitled to dividends, but it is getting a good share of your profits if you scrap worn or damaged equipment that oxwelding can reclaim.

The management of a blast furnace found that, with the oxy-acetylene welding and cutting process parts formerly discarded could be repaired at a saving of $5,925.00 a month in replacement costs. Thousands of other organizations use oxwelding for maintenance and repair just as effectively—and reduce scrap losses to a minimum.

Oxwelding equipment is inexpensive. Any good workman can be trained to operate it in a relatively short time. The savings that oxwelding can effect in your plant will pay real dividends to you.

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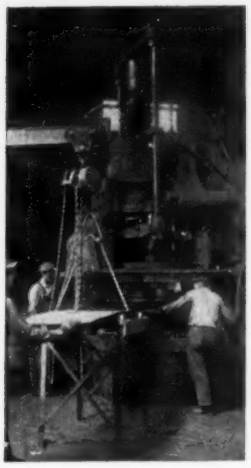
A-1674

Making the Most of

METHODS AND MATERIALS



CORROSION-resisting properties of the various grades of chromium and nickel alloy steels, bars and billets for reforging only, must be determined by subjecting a salt spray test specimen to a salt spray test for 24 continuous hours at room temperature, approximately 65-80 degrees Fahr., using a 20 per cent by weight chemically pure sodium chloride solution, according to new and tentative specifications of the navy department covering such material for reforging. This test shall be conducted in a closed tank of neutral material, such as Alberene stone, and the spray shall be finely divided. The tank shall be so designed that there will be no direct impinging of spray upon the test specimen, and the spray shall circulate freely about all the specimens to the same degree, and no liquid which has come in contact with the specimens shall return to the aspirator to be resprayed. Prior to testing, the specimen must be washed in petrolic ether and alcohol and dried. Not less than one salt spray test specimen will be selected by the inspector to represent each size in each melt. When practicable, the salt spray test specimens may be located half way between the center and outer surface of the material. Unless otherwise specified, the specimens for magnetic permeability will be 2 inches long by ½-inch in diameter, ground and polished.

\$ \$ \$

Bearings starved of lubricant or attacked by foreign substances cannot function properly. This known fact is a troublesome factor in machine building which manufacturers are combating by the application of unit packing glands, self-contained oil and grease retaining parts which may be specified and installed without the necessity for detailed design. Modern mechanical standards, requiring the utmost in efficiency, endurance and economy in the design and operation of all types of machinery have been responsible for the success of these seals.

\$ \$ \$

In some cases heat treating operations have been eliminated because of the cutting characteristics of tungsten carbide milling cutters. Naturally, when harder materials are to be machined, the peripheral speed of the cutter must be reduced accordingly. There are certain products which must be made of hard material which at this time can not be machined economically, because of the high tool cost of cutters, other than those fitted with tungsten carbide.

\$ \$ \$

In the manufacture of superheater coils for locomotives, lengths of seamless steel tubing are butt welded by the oxyacetylene process to produce a tube of sufficient length to wind the whole coil. If one welded joint should fail, the cost of removing, repairing and remounting the coil in the boiler is approximately \$300, or slightly more than ten times the cost of making a complete radiographic examination of all joints in any one coil.

A NEW theory of lubrication, advanced as a result of tests made on a new machine for investigating lubrication phenomena, is to the effect that a layer of oil is formed on the surface of metal, the thickness and strength of which are determined by the character of the lubricant and metal. The layer of lubricant pumps oil into the crevices of the metal under pressure. In the course of contact with the bearing surfaces on the journal and the brasses, the free film plays no part as a means of separating the surfaces of the metal. This separation is accomplished by the newly discovered adhering layers of lubricant, and when these are wiped off in the course of operation of the bearing they are restored immediately by the oil ejected from the crevices in and under the metal surfaces.

\$ \$ \$

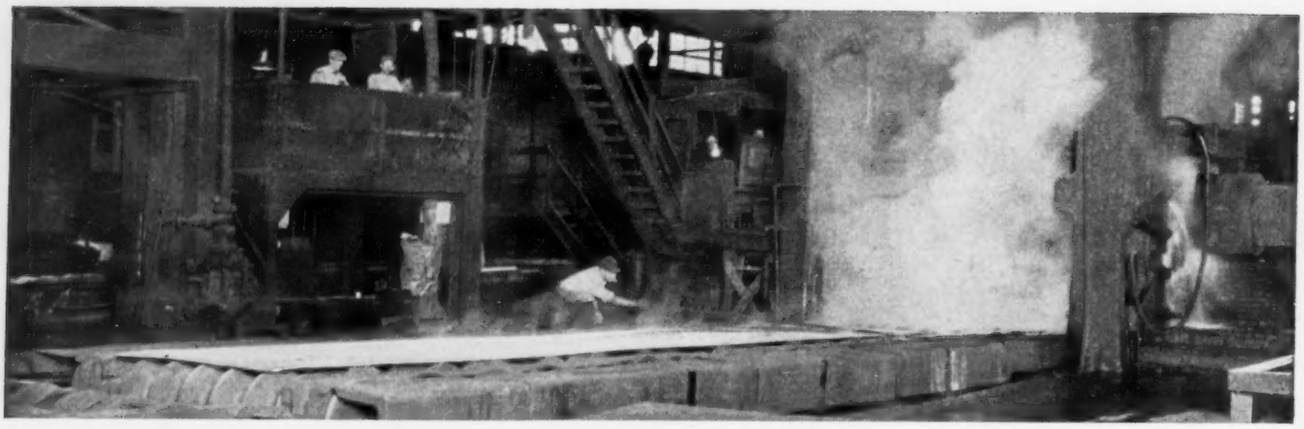
Among small tools which have been chromium plated with success are: Reamers, burnishers, broaches, arbors, plugs and ring gages, bushings, drawing dies, lathe centers, tool tips, twist drills, slitting saws, sewing machines and knitting needles, files, thread chaser and porcelain dies.

\$ \$ \$

One of the most reliable methods of eliminating noise in gear trains or in geared connections is to provide composition gears to mesh with the metallic gears. This efficient method of providing quiet is well known. A fiber manufacturer, however, has developed a spoke-type gear which still further reduces noise. In comparative tests of a solid web and a spoked gear for use on camshaft drives, in the solid web gear the volume of sound increased with the load, while in the spoked type it decreased as the load increased. The volume of sound emitted by the spoked gear was only about one-third as great as that from the solid gear.

\$ \$ \$

A new fastening device recently placed on the market completely conceals and locks in position bolts, screws or nuts. This device combines an ingenious lock washer and a metal cap, the lock washer having a four-point locking arrangement and being cup-shaped with projecting prongs which engage and securely hold the decorative cap. The rust-proof caps are either drawn metal in any finish or molded bakelite. Another type of fastening consists of a flat washer with multiple points projecting at right angles in such a manner as to give the appearance of a crown. After the screw or bolt is driven, a special hand tool is used to draw the projecting points together over the center of the washer to form a smooth, hemispherical cap.



PROGRESS IN STEELMAKING

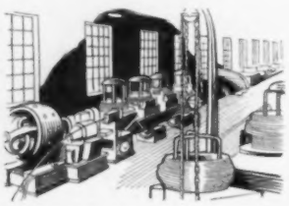
EMBRITTLEMENT of structural steel subjected to the galvanizing process has been traced to stresses imparted by punching the rivet holes and to the pickling temperatures, according to recent investigation. Safeguarding heavy structural sections against this condition is had by drilling or reaming the rivet holes.

♦ ♦ ♦

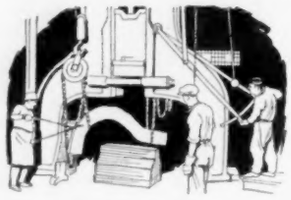
Rapid handling of seamless tubes in and out of car bottom annealing furnaces at a plant near Pittsburgh has increased the output and reduced the heat lost from the car and furnace during the operation. By means of high-speed electric rack and pinion car pullers and electric door raising devices the car is removed from the heating chamber, unloaded and loaded, returned to the furnace and the charging door closed, all within a period of 3 minutes.

♦ ♦ ♦

Field tests conclusively prove that when the acidity of the cooling water used on mills equipped with phenolic laminated fabric bearings is maintained below 15 parts per million, the roll necks show less roughing and maximum bearing life is secured.



THREADING a double-deck wire drawing machine now is accomplished by a new method. The die holder is elevated by a counterweighted lever which brings the first or lower die in alignment with the wire line of the upper block. The pointed end of the wire is fed through the first die and coiled for several wraps around the upper block. The coil then is loosened and transferred to the lower block. The die holder is returned to its original position. The leading end of the wire then is passed over a guide pulley, threaded through the upper die and drawn to a finished coil.



INCREASING the density of a steel forging results in improved machineability and durability of parts, according to recent tests. Increased density is obtained by the use of high compression of the metal during the forging operation. The ductility of the fibers is improved and the flow of metal in the dies promoted when the forging bars are subjected to an anneal before heating for forging, thus imparting coarseness to the structure. Machineability has been improved from 50 to 400 per cent, speeds and feeds increased from 11 to 60 per cent and overall cost per job in one plant reduced from 84 to 44 cents by the adoption of this method.

♦ ♦ ♦

Paint resistant to hot water, steam and rust but which does not retard the transfer of heat, has been developed for coating the interior surfaces of iron and steel boiler tubes and drums. It is unaffected by any harmful elements that might be present in the water or steam, or the ratings, pressures and temperatures at which the boiler may be operated.

♦ ♦ ♦

Pure iron is being made in Germany by a new process said to be applicable on a large scale. Carbon monoxide passed over purified hot iron unites with the metal to form iron carbonyl, a liquid of relatively low boiling point. Applying heat to this liquid expels the carbon and oxygen, leaving particles of iron of about 20-millionths of an inch diameter. When this powder is heated to 2192 degrees Fahr. the iron becomes solid and resembles copper in its softness, resistance to corrosion and other properties.

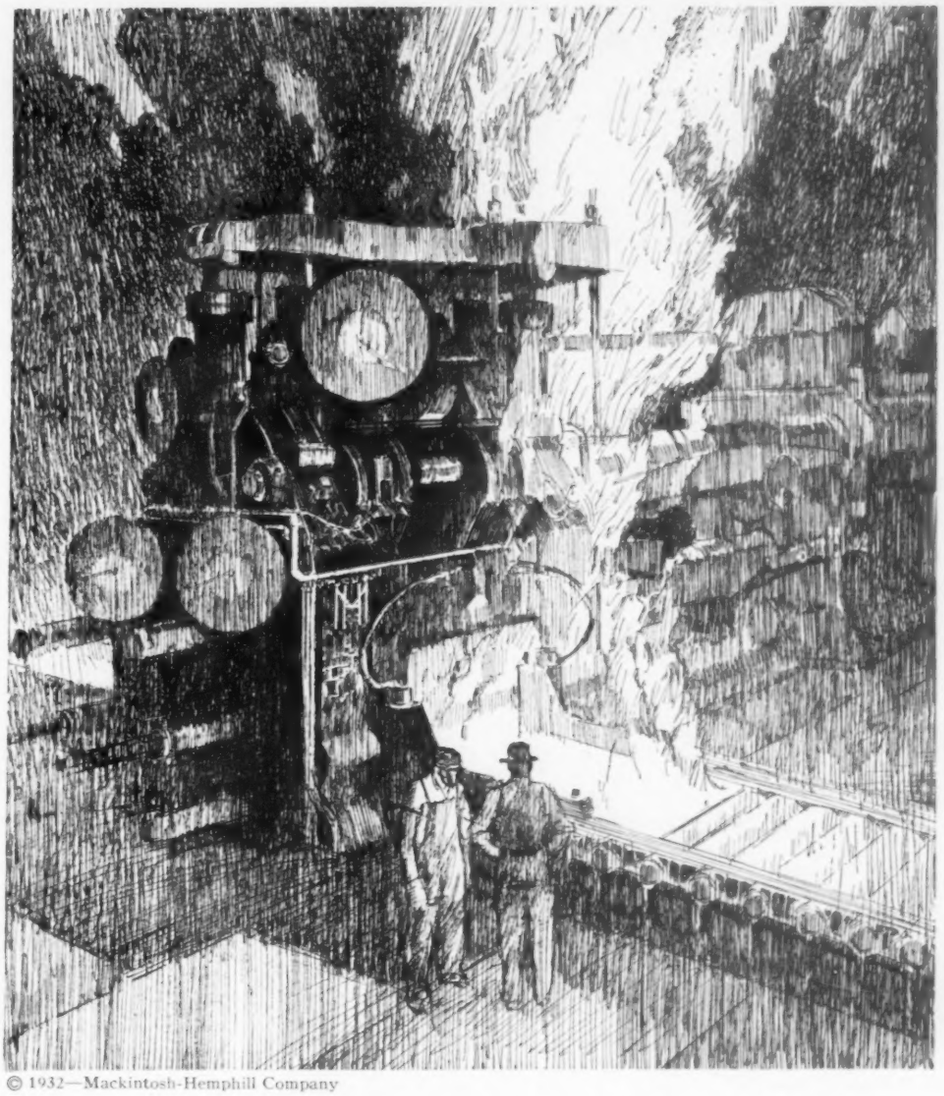
♦ ♦ ♦

Newly designed circuit breakers for general steel mill duty have bars of silver brazed to the stationary contact blocks and to the bridging members. In a recent test, one of these silver-faced breakers was electrically closed and tripped 50,000 times with the contact characteristics remaining unchanged.

♦ ♦ ♦

Plating iron and steel commodities with corrosion-resisting metal by spraying the alloy on the surface has been accomplished by a Swiss engineer. The spray gun essentially is a combination oxyacetylene torch and pneumatic atomizer. The plating metal in wire form is fed into the gun automatically, rendered molten by the oxyacetylene gas and atomized as it leaves the nozzle of the gun.

BASED on an annual output of 55,000 tons of high-grade sheets rolled by an Ohio producer on mills equipped with mechanical feeder and catcher tables, the scrap loss including that which arises in resquaring and pickling, averages slightly under 13¾ per cent.



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9 out of 10 are Mackintosh-Hemphill Made

In the past eight years, Mackintosh-Hemphill has, on the average, built a universal mill every eight months. One of these mills is illustrated above.

Mackintosh-Hemphill designed and built over 90% of all the universal mills in this country.

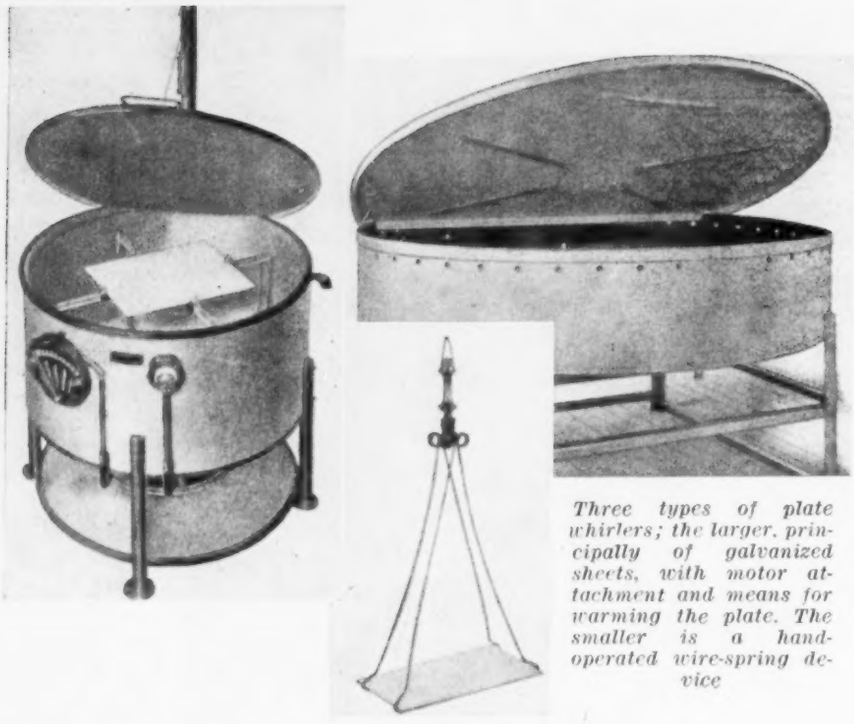
The largest universal mill in the world, now operating in England, was designed by Mackintosh-Hemphill engineers. (Construction was handled in England because of the cost and difficulty of shipping the gigantic parts).

These facts tell a convincing story of established leadership. Leadership that has, in its various phases, been recognized by the iron and steel industry for 130 years.

MACKINTOSH-HEMPHILL COMPANY

Since 1805 . . . at Pittsburgh

A copy of the illustration suitable for framing will be sent you without charge, on request. It is one of a series of ferrous industry scenes in etching style.



Three types of plate whirlers; the larger, principally of galvanized sheets, with motor attachment and means for warming the plate. The smaller is a hand-operated wire-spring device

Large Uses of Steel In Small Ways

228th Article ◆ Photomechanical Whirlers

EVERY time you see a picture on a printed page you may be reasonably certain that in the initial stage of its production a so-called whirler has been employed, and that steel has been used in the whirling. The only exceptions to this rule are the photo-gravures and a few other special art processes, for small work; and the crayon type of lithographs for billboards.

In the United States there are 625 photoengraving and 500 lithograph platemaking establishments, and one or more whirlers are in use in each plant practically every day it is in operation. They are indispensable parts of the equipment, and combined they consume a large tonage of steel.

In the manufacture of light-sensitive films and papers, coating machines, built largely of steel, are used to spread a thin film of emulsion on the celluloid or paper, as it is drawn through the machine. But in making metal printing plates, the only practical method of obtaining the necessary thin and even coating of the sensitive medium is by whirling the plate. The surplus liquid is driven off by centrifugal force, the thickness of the film depending upon the viscosity of the liquid, the speed at which the whirler is driven, and the temperature.

These whirlers vary in size from motor-driven machines having a surrounding tank more than 6 feet in diameter to the simple hand-operated type suitable for use with the smallest size plates. The former consists of a revolving table made up of horizontal steel bars to which the plate is affixed, located within a steel tank that retains the spray thrown off the work. The base of the platform usually is cast iron, and the motor ordinarily mounted directly below the machine. This permits the introduction of the work from the top.

Some Have Overhead Motors

Whirlers designed for use in large commercial establishments and in metropolitan newspaper plants, where the rapid and efficient coating of plates is essential, have a vertical motor located on top of the machines, and the plates are inserted and removed through a counterbalanced side door.

When a copper or zinc plate, for example, is revolved after coating, an even distribution of the film results and by means of a heating unit incorporated in the whirling machine the surface is dried. Gas or electric heating units may be used to accomplish the drying. The solution thrown from the plate during the whirling operation is washed off the side of the tank by a continuous stream of water against the inner surface.

Small establishments may use a simple hand operated whirler consisting of merely four vertical spring wires affixed to a ball bearing which permits the work to revolve freely. The wires hold various size plates securely. To catch the liquid thrown off during the whirling, a wood or steel container is employed. The latter frequently is made of 20 or 22 gage galvanized sheets, is 36 to 48 inches in diameter, 40 inches in height and is tapered at the bottom. A water pipe running entirely around the top is perforated to direct the water stream against the side. Steel bars or angles comprise the supporting legs of the container.

Such a tank weighs 90 to 100 pounds, while the larger whirlers weigh up to 900 pounds, made up principally of steel parts. Galvanized sheets also are used frequently in the larger sizes, while some plate whirlers for washing, sensitizing and drying photo-lithographic plates use enameled sheets in the construction of the tank. Tubing also may replace steel angles for supporting legs.

Legalized Beer Would Open Market for 18-8 Steel

Experience abroad has demonstrated the suitability of stainless steel of the 18-8 chrome-nickel type for equipment used in the brewing industry (STEEL, Aug. 18, p. 33). As is well known, this steel combines high resistance to corrosion and oxidation with high strength, good ductility and the ability to take and hold a beautiful polish. Exhaustive tests have been conducted in England to determine the effect of beer upon this alloy steel and of the steel upon the beer. It was found that in every case the beer produced was of excellent quality. The steel also proved to be inert to the action of fermentation.

Stainless steel has been used for some time for brewing equipment in England, Germany and Switzerland with marked success. Practically all types of apparatus such as yeast pans, fermentation vats, tanks, coils, casks, etc., have been made from this alloy steel.

The properties and advantages of this steel for brewing equipment are discussed in a booklet "Use of Stainless Steel in the Brewing Industry," recently published by Electro Metallurgical Co., 30 East Forty-second street, New York. Copies may be obtained upon request.

Scanning the Field of Technology

A Digest of Important Developments Pertaining to the Production, Processing, Application and Performance of Steel

Steel Castings and Their Use in Navy Vessels

By Rear Admiral George H. Rock, in The Foundry, September, 1932, p 28, 3 pp., 3 illusts.

Art of manufacture of steel castings has progressed enormously in recent years, and ship designers have taken advantage of possibilities offered. While the use of steel castings in ship construction has increased greatly, unfortunately this use has not been attended with entire success, and in many cases serious embarrassment has been caused by difficulties and delays in obtaining satisfactory castings and the failure of defective castings actually installed.

Defects most generally found in many of the large hull castings are those familiar to shipbuilders—shrinkage cracks, blowholes and cavities. At times it has appeared that requirements of the designer were such that satisfactory steel castings could not be produced. However, in each such case careful study and adoption of special measures by the patternmaker and molder have proved the possibility of making satisfactory castings to meet requirements. Apparently the solution lies to some extent in improved foundry practice, methods of molding, chilling, size and location of gates and risers, temperatures for pouring, etc.

—STEEL, 10-17-32

Carburizing Small Parts By the Carbonol Process

By E. M. Slaughter, metallurgist, National Acme Co., Cleveland, Machinery, September, 1932, p. 41, 3 pp., 2 illusts.

The so-called "Carbonol" process of carburizing consists primarily of heating the work thoroughly in a retort and then admitting oil, which is caused to impinge on the hot walls of the retort by a rapidly revolving fan. The oil is thus transformed into an active carburizing gas. The means provided for accurate control of the heat and the amount of oil admitted make it possible to obtain uniform results.

In a typical installation, the furnace used is of the vertical type, electrically heated, with a 66-kilowatt rating. In the heating zone is an alloy retort containing the work basket, which is 18 inches in diameter by 36 inches in depth. To the top of the retort is bolted the cover, which contains the fan mechanism and the oil reservoir.

Three thermocouples, two in parallel, control the three heating zones. The bottom and middle zones operate from an indicating pyrometer, and the upper zone operates from a recording pyrometer. Both instruments have front dial setting, which facilitates operation.

—STEEL, 10-17-32

Influence of Hot Working On Alloy Structures

By W. J. Merten, Heat Treating and Forging, September, 1932, p. 525, 4 pp., 6 illusts.

Tempering of quenched, forged and rolled steel parts is a practice requiring precautions in uniformly slow heating. Incipient failure by formation or development of surface fissures due to warping and localized straining occurs during this heating, which is conducted at a temperature where ductility is low and brittleness at a maximum. Starting with a low temperature and raising furnace and steel forging slowly and uniformly to the tempering heat is a precaution which recommends itself.

Steel of high strength and ductility depends upon ideal grouping and positioning of alloying elements and metalloids including carbides, and a sorbitic structure intermediate between finest and lamellar pearlite must be the final result of the mechanical and thermal treatment given the material.

—STEEL, 10-17-32

Determining Analysis of Metals by Spectrograph

By Joseph Geschelin, Automotive Industries, Sept. 17, 1932, p. 358, 3pp., 3 illusts.

Although the spectrograph is well known to physicists and research chemists, it is a comparatively new tool so far as the large group of analysts, laboratory workers and engineers is concerned. Moreover, while qualitative results have obtained for a long time it is only recently that the equipment and technique have produced quantitative results. But the most interesting point is that patient and persistent work has produced accessories and equipment suitable for routine laboratory work. The spectrograph has emerged from its scientific environment.

Among the wide range of industrial problems which come within the province of spectrography are: Analysis of materials purchased on specifications limiting the amount of impurities; guiding the development of alloys for die castings, forgings, etc., by quantitative analysis for necessary constituents present in minute quantities; rapid identification of unknown substances, mixed stocks and the sorting of scrap; checking of foundry mixtures to control special alloys. The underlying principle upon which spectrography is based is the fact that every chemical element, if heated to a high enough temperature so that it is partially or completely vaporized, and the vapor brought to a condition of incandescence, emits light which is composed of a number of wave lengths definitely characteristic of that element.

—STEEL, 10-17-32

Fatigue of Metals and Its Relation to Design

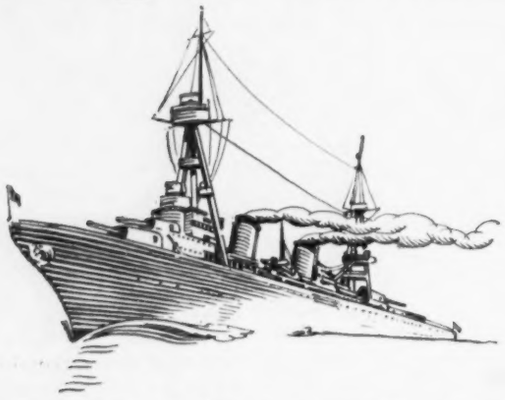
By T. A. Solberg and H. E. Haven, Metals and Alloys, September, 1932, p. 196, 4 pp., 12 illusts.

Use of the word fatigue in connection with certain metal failures has been confusing for the reason that the so-called failures are not the result of any "tiredness" or "weariness" of the metal structure, which the word fatigue implies. In the past the characteristic fatigue failures were ascribed to crystallization of the metal because of the crystalline appearance of a portion of the fracture. Application of the microscope and more recently the X-ray has proved conclusively that no crystallization or other change in the metal structure takes place when it is subjected to stresses that result in fatigue failure.

A fatigue failure of metal will occur when the metal is subjected to a sufficient number of applications of repeated stress which exceed a limit known as the endurance limit. Corrosion fatigue is a special case of fatigue in which the initial crack or point of stress concentration is found at an area which has become pitted or corroded by some agent, usually fresh or salt water.

—STEEL, 10-17-32

If you want unbiased help in selecting Alloy Steel . .



■ With scores of alloy steels available, selecting the few that will do your job best is not easy. To give you practical and unbiased help in this task is the purpose of Electromet Engineering Service. ■ Electromet's suggestions are unbiased because Electromet is not a manufacturer of alloy steels, and favors no one producer or product. Selling ferro-alloys to makers of all kinds of steel, Electromet needs—and has—a vast fund of data on every composition. It is from this up-to-the-minute information that Electromet engineers draw when they study your problem and recommend the steel that will suit it best. ■ Taking advantage of this service will insure the results you expect from alloy steels. You are welcome to it at any time. A request on your letterhead will bring you complete information.

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NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Chaser Grinding Unit Is Bench Type

National Acme Co., 170 East 131 street, Cleveland, has announced a new bench-type chaser grinding machine, designated size No. 0. The unit, shown herewith, is small, compact and rigid. While intended primarily for grinding tap and die chasers, it can be used to advantage on a wide range of work.

In large shops it may be installed close to the threading machines so that chasers need not be carried to the tool room at some distant point.

Bench-type chaser grinding unit built by National Acme Co.

When installed in the tool room, on the other hand, it fills a widespread need for a small convenient machine.

The knee can be raised or lowered readily or the table moved away from the column. As an additional convenience the company can furnish the grinder with cast iron base mounted on casters for portable use. A ½-horsepower, 110 volt, 60 cycle, 3450 revolutions per minute, single phase high-speed motor is standard equipment recommended for average shop practice.

◆

Markets Automatic Nut Lock

Ohio Equipment Co. Inc., 5716 Euclid avenue, Cleveland, is marketing an automatic nut lock which locks any nut on its bolt. The lock is unlocked by giving the nut a quarter turn to the rear with an ordinary wrench to loosen it. Locking action is obtained by a flat spring wire placed in a slot which extends the complete depth of the nut at one corner and bent over to meet the bolt threads. The wire closely fitting in the slot causes the free end of the lock to make a pressure contact on the bolt threads when the nut is run on.

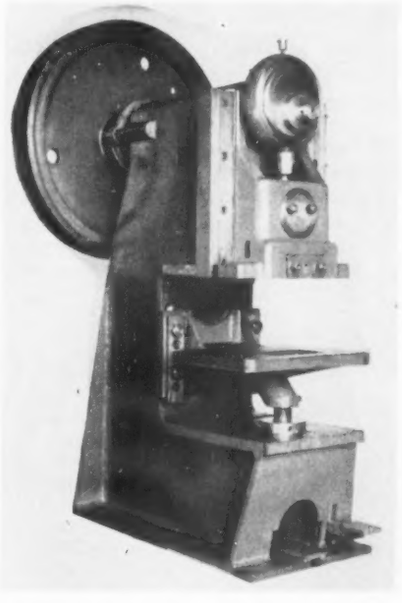
When the nut is to be released, a quarter turn pushes the lock away from the nut and reverses the slant with relation to the center line of the bolt, allowing the nut to be turned off easily. The fastening is made in sizes ½-inch and larger and the company can apply the lock to nuts furnished by the manufacturer of the finished equipment.

◆

Deep Throat Press Operates At High Speed

Service Machine Co., 754 Broadway, Elizabeth, N. J., has placed on the market a 50-ton welded steel frame deep throat press, shown herewith. The new unit is a high-speed machine operating at a maximum speed of 125 revolutions per minute, and is designed for heavy puching and stamping operations particularly.

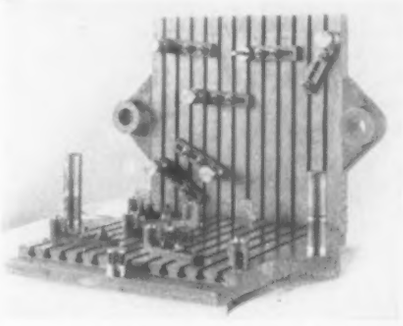
Heavy plate welded construction of the housing insures a rigid unbreakable frame of box-type, reinforced against distortion. A bolster



Welded steel frame press manufactured by Service Machine Co.

adapter is provided to give a wide range of shut height capacity. An adjustable bed can be furnished for use on lighter classes of work where quick set up is desired on dies varying widely in shut height.

Eccentric can be interchanged quickly for various lengths of stroke by removing the nut on the front of



Adjustable perforating die developed by S. B. Whistler & Sons Inc.

the shaft. End of the shaft carrying the eccentric is tapered to secure close fitting. Any stroke can be provided up to a maximum of 4 inches.

◆

Newly Developed Perforating Die Is Adjustable

S. B. Whistler & Sons Inc., 752-754 Military road, Buffalo, has devised a perforating die, as depicted above, which can be adjusted to pierce sheet up to ⅛-inch in thickness, in any arrangement or group of holes which may be desired. Size of sheets is determined only by the press or bolster area.

Location of the punches and dies can be changed to any desired group, or arrangement of holes, within a short time, thus eliminating the cost of new dies for each new article pierced. All punches and dies may be replaced or changed while dies are in press without disturbing set-up.

◆

New Pump Handles Either Water or Oil

Tomkins-Johnson Co., Jackson, Mich., has developed a new pump designed to eliminate the necessity of closely fitting and closely machined parts within the pump cham-

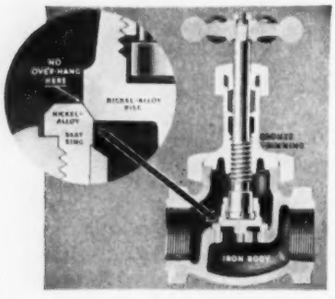
ber and at the same time provide efficient operation. The pump, shown below, is supplied with ½-inch intake and ¾-inch outlet to provide 7 gallons per minute capacity at 1000 revolutions per minute and 14 gallons per minute capacity at 1725 revolutions per minute, or with 1-inch intake and 1-inch outlet capable of 31 gallons per minute at 1725 revolutions per minute.

Pressure lubrication fittings are provided throughout. Since there is no appreciable back pressure, no relief valve is necessary; no check valve is necessary. The cap to which the discharge connection is attached may be rotated to any desired position on the housing. Either water or oil or any combination of the two is handled efficiently and is not affected by grit, chips or foreign matter which may enter it.

◆

Valve Embodies Improved Seating Arrangement

Jenkins Bros., 80 White street, New York, recently announced that a new and improved seating arrangement for regrinding valves has been embodied in its line of iron body, bronze trimmed, globe valves. The diameter of the disk does not over hang the bevel contact surface of the seat ring. Therefore the valve may be repeatedly reground without forming a groove or shoulder in the disk, and the area of contact between the disk and seat remains constant.



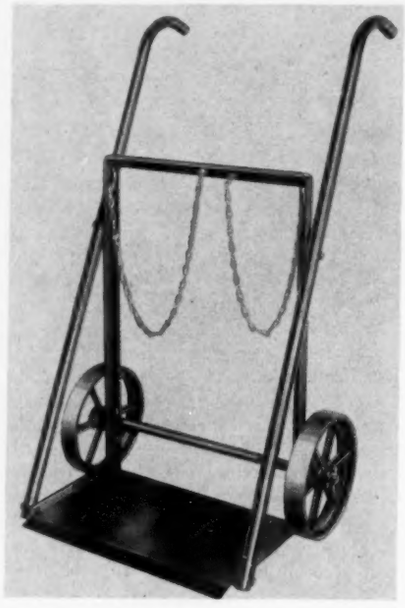
Jenkins Bros. iron body bronze globe valve

The improved design reduces leakage troubles, gives extended service and prevents costly maintenance. This valve, as shown in the illustration herewith, is supplied with renewable nickel alloy seat ring and disk, and manganese bronze spindle with extra long thread. Or, if preferred, renewable bronze or stainless steel seat ring can be supplied. A feature of this valve is the extra deep stuffing box.

◆

Designs Truck for Handling Oxyacetylene Cylinders

Linde Air Products Co., 30 East Forty-second street, New York, has introduced a new cylinder truck, as depicted in the illustration above. This new accessory should be of considerable interest to welders and to shops in which portable oxyacetylene welding and cutting equipment is used. The truck increases the ease and convenience of moving the welding or cutting outfit from place to place in the shop or yard and of transporting the outfit to outside jobs.



Cylinder truck designated No. 5 introduced by Linde Air Products Co.

A beveled steel plate welded to the frame forms the cylinder platform. Handles made of 1¼-inch pipe curved to provide a firm grip, are securely bolted to the cylinder platform and to the upper part of the frame. Cylinders are held firmly in position on the truck by means of chains which are adjustable.

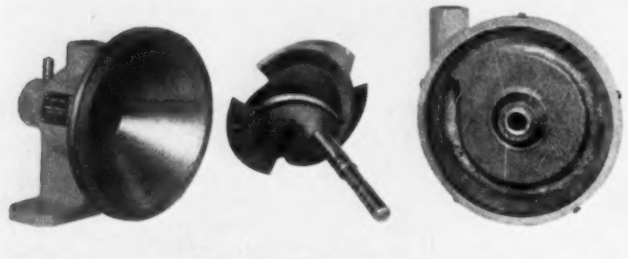
◆

Bearing Designed To Take Combined Loads

Norma-Hoffmann Bearings Corp., Stamford, Conn., announces an addition to its extensive line of bearings, its type CD duplex double angular contact ball bearing. This unit, shown in the accompanying illustration, has been developed to meet the need for a bearing adapted not alone for radial loads but also for high thrust loads in either direction, with a width no greater than that of a standard single-row ball bearing.

DEVELOPED to provide a bearing adapted not alone for radial loads but also for high thrust loads in either direction, this new bearing recently introduced by Norma-Hoffman Bearings Corp., has a width no greater than that of a standard single row ball bearing

The outer ring is made in two parts; and both inner and outer raceways are ground to a special curvature suitable for safely carrying heavy end thrust. A one-piece ball retainer of extruded bronze rides, or is carried, upon the ground flanges of the inner ring. The new bearings are available in the light, medium, and heavy metric series in a range from 10 millimeters to 100 millimeters bore. They should be used only where the thrust load exceeds the radial load.



Disassembled view of Tomkins-Johnson pump which handles either water or oil and is not affected by foreign matter

Steel Rate Loses Momentum as It Goes to 19.5

Further Gain Depends Upon Assistance from Tonnage Buyers—Railroads Best Prospect—190,000-Ton Bridge Financed—Pig Iron Shipments Better

STEEL production advanced half a point to 19½ per cent in the week ended Oct. 15, but the rising curve which has put the steel rate up six points in six weeks appears to be flattening out.

For the substantial market improvement since Sept. 1, small and moderate-size consumers are almost entirely responsible. It is becoming evident, however, that demand from this class can do little more than maintain itself in the immediate future, and any further substantial improvement must originate with tonnage buyers.

Because automobile manufacturers have become ultra-conservative, their assistance the remainder of the year will be subnormal. Building steel requirements continue bright, and by November may put actual orders on mill books, but this week bookings again are below the average. The railroads loom as the best customers for steel.

This week for the first time the imminence of the national election is casting a shadow on the market for iron and steel. Even small buyers are more cautious in their commitments, and in the East some fears are expressed over a possible lowering of a tariff wall which is proving inadequate to prevent a harmful inflow of foreign steel.

Momentarily the Pennsylvania railroad is expected to allocate about 15,000 tons of plates for the 1285 freight cars it will build with R. F. C. assistance. The Reading, which has bought 1500 tons for cars, has 2200 tons more to place. Interstate commerce commission approval of an R. F. C. loan to the Baltimore & Ohio will release material for repairing 165 locomotives and 2500 freight cars and building 820 gondolas—about 20,500 tons.

Over the next 60 days substantial orders for rails—considering the times—may be matured by federal funds. One Pittsburgh district rail mill expects to operate for two periods by the end of the year; the Norfolk & Western award of 5000 tons of rails, expected this week, may be the signal for resumption.

Leading, in point of steel requirements, all projects financed by the R. F. C. is the San Francisco-Oakland bridge, for which 170,000 tons of structurals and cable and 20,000 tons of reinforcing bars will be purchased. This tonnage, however, probably will not be rolled this year. Last week's structural awards totaled only 6712 tons, lowest in many weeks.

Sheet mills have been slightly more active, partially due to the Oct. 15 deadline on specifications against lower-priced third quarter contracts. On galvanized sheets the market seems better established at 2.85c, Pittsburgh, but on other grades concessions have not been entirely eliminated. Tin plate mills expanded five points, to 45 per cent, at Pittsburgh last week.

Scrap still is in a period of recuperation following its rapid rise, and railroads have withdrawn some offerings on account of dissatisfaction with quotations. The market level as a whole, however, is unchanged, and the scrap composite of STEEL stands at $6.96, compared with $5.96 in the last half of July, when the rise began.

Pig iron is being taken in by more foundries, in some measure in anticipation of a heavier melt. Shipments in the lake region are running considerably ahead of September. At Chicago, covering into the first half of 1933 is reported. Pig iron prices are steady except for basic in eastern Pennsylvania, which is 25 cents easier on the strength of a purchase of 20,000 tons.

Strength displayed by galvanized sheets more than offsets this softness in pig iron and puts the iron and steel composite of STEEL up 3 cents this week to $29.33. Sheets also have lifted the finished steel composite 10 cents to $47.70.

Composite Market Averages

	Oct. 15	Oct. 8	One Month Ago Sept., 1932	Three Months Ago July, 1932	One Year Ago Oct., 1931	Ten Years Ago Oct., 1922
Iron and Steel Composite	$29.33	$29.30	$29.32	$29.47	$30.74	$43.60
Finished Steel Composite	47.70	47.60	47.50	47.71	48.22	59.55
Steelworks Scrap Composite	6.96	6.96	7.04	6.06	8.50	18.45

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Melting steel, compressed sheets.

COMPARATIVE PRICES OF IRON, STEEL AND COKE

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	Oct. 15, 1932	Sept., 1932	July, 1932	Oct., 1931
Pig Iron				
Bessemer, del., Pittsburgh	$15.76	15.76	15.76	18.16
Basic, valley	14.00	14.00	14.00	16.50
Basic, eastern, del. eastern Pa.	13.50	13.75	14.25	16.35
No. 2 foundry, del. Pittsburgh	15.76	15.76	15.76	18.16
No. 2 foundry, Chicago	15.50	15.50	15.50	17.20
*Southern No. 2, Birmingham	11.00	11.00	11.00	12.00
**No. 2X, Virginia furnace	17.75	17.75	18.00	18.00
**No. 2X, Eastern, del. Phila.	14.26	14.26	14.76	17.26
Malleable, valley	14.50	14.50	14.50	16.90
Malleable, Chicago	15.50	15.50	15.50	17.10
Lake Superior charcoal, del. Chi.	23.04	23.04	23.04	25.04
Gray forge, del. Pittsburgh	15.63	15.63	15.63	17.53
Ferromanganese, del. Pittsburgh	73.24	73.24	73.24	89.79

*1.75-2.25 silicon. For local delivery. Northern shipments based on $10, Birmingham. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

Coke				
Connellsville, furnace, ovens	2.00	2.00	2.00	2.40
Connellsville foundry, ovens	2.75	2.75	3.00	3.25
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	29.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	29.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	29.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00

	Oct. 15, 1932	Sept., 1932	July, 1932	Oct., 1931
Finished Material				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.60
Steel bars, Chicago	1.70	1.70	1.70	1.70
Steel bars, Philadelphia	1.91	1.91	1.91	1.89
Iron bars, Chicago	1.65	1.65	1.65	1.70
Shapes, Pittsburgh	1.60	1.60	1.60	1.60
Shapes, Philadelphia	1.75	1.75	1.75	1.76
Shapes, Chicago	1.70	1.70	1.70	1.70
Tank plates, Pittsburgh	1.60	1.60	1.60	1.60
Tank plates, Philadelphia	1.79½	1.79½	1.79½	1.80½
Tank plates, Chicago	1.70	1.70	1.70	1.70
Sheets, No. 10 blue anneal., Pitts.	1.70	1.70	1.70	1.85
Sheets, No. 24 hot ann., Pitts.	2.10	2.10	2.20	2.40
Sheets, No. 24 galvan., Pitts.	2.85	2.75	2.85	2.90
Sheets, No. 10 blue anneal., Chi.	1.85	1.85	1.85	2.00
Sheets, No. 24 hot ann., Chi.	2.25	2.25	2.35	2.55
Sheets, No. 24 galvan., Chi.	2.90	2.90	3.00	3.05
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Tin plate, per base box, Pitts.	4.75	4.75	4.75	4.75
Scrap				
Heavy melting steel, Pitts.	$9.50	9.50	8.35	10.45
Heavy melting steel, eastern Pa.	7.25	7.25	6.25	8.20
Heavy melting steel, Chicago	6.00	6.00	4.50	7.75
No. 1 wrought, eastern Pa.	7.25	7.25	6.25	9.20
No. 1 wrought, Chicago	5.25	5.25	4.00	8.00
Rails for rolling, Chicago	8.25	7.25	6.60	10.50

Sheets

Mill Operations Increased—Automotive Releases Improved Slightly—Shipments Better

SHEET PRICES, PAGE 45

Pittsburgh — Mill operations on common and full finished sheets have been extended the past ten days to over 20 per cent, due to increasing specifications. Galvanized and black sheets continue to lead, although there has been little demand for full finished. A few automotive orders have been released. Several stove and range interests are operating at their peak for the year. Black sheets are quoted at 2.10c to 2.20c; No. 10 cold-rolled, 2.10c.

Boston — Massachusetts highway department is taking bids on about 750 tons of No. 24 hot rolled annealed sheets for automobile plates.

New York—Sheet buying is quieter than a week ago. Consumers appear to be holding up orders, pending the nearby national election. Certain grades, particularly galvanized, which appeared fairly firm earlier in the month, are less steady.

Philadelphia — Except for two grades of hot rolled sheets, prices are soft. Galvanized are again quotable at 2.75c to 2.85c, Pittsburgh, while No. 24 annealed are subject to shading at 2.10c to 2.20c, Pittsburgh. The cold rolled grades are unsettled in price. A fair tonnage of sheets will be required for the United States customs house, this city.

Youngstown, O.—Moderate expansion in sheet business has led to further resumption of mills. The Republic Steel Corp. has put on five units at its Niles, O., sheet mill, and the Mahoning Valley Steel Co. has reopened its Niles plant for partial operation. Considerable business is coming from Chevrolet, Buick and Chrysler, some from Willys-Overland and Studebaker, and the remainder from miscellaneous sources such as stampers, car repairers and refrigerator makers.

Cleveland—Sheet shipments were better in the past week, due in part to the fact some mills fixed Oct. 15 as the deadline at which consumers could take advantage of low prices issued during the latter part of the third quarter. In a few instances mills could not ship all that was specified up to that date. Sheetmakers hope to hold recent gains in the volume of new orders, though approaching a period when both the influence of elections and inventories will exert some influence. Small, miscellaneous orders continue fairly satisfactory. Chevrolet has released some tonnage for Oct. 17 against its recent purchase. Except concessions to barrelmakers, black sheets are holding fairly steady at 2.20c, base Pittsburgh.

Cincinnati — Broader buying of sheets, with fair ordering from automotive interests, has kept mills in this district operating at about 30 per cent.

Chicago — Better sheet demand from small users is offsetting poor requirements of the automotive and farm implement industries. Only small gains are noticeable but sales and operations are slightly better than in September. Roofing material continues to move slowly in agricultural districts. Mill operations are slightly heavier at 15 to 20 per cent. Prices are steadier, producers usually quoting 2.30c, base, for hot rolled annealed sheets, and 2.95c for galvanized.

St. Louis—Demand for galvanized sheets in the South and Southwest is more active. Buying by the railroads for repair work also has improved. Due to readjustments in freight rates in this district, the leading producer here has announced some reductions in sheet prices.

Birmingham, Ala.—A slight reduction in sheet production here is said to be temporary. Small consumers are placing orders steadily.

CURRENT FINISHED STEEL PRICES

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Steel Sheets

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.55c
Gary, Ind. Harbor, base	1.65c
Chicago, delivered	1.70c
New York, delivered	1.90c
Birmingham, base	1.70c
Philadelphia, delivered	1.86c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.70c
Chicago, district mills	1.80c
Chicago, delivered	1.85c
Philadelphia, delivered	2.01c
New York, delivered	2.05c
*St. Louis, delivered	2.04c
Birmingham, base	1.85c
San Francisco c.i.f.	2.32½c

HOT ROLLED ANNEALED NO. 24

Pittsburgh, base	2.10c to 2.20c
Gary, Ind. Harbor, base	2.20c to 2.30c
Chicago, delivered	2.25c to 2.35c
New York, delivered	2.45c to 2.55c
Philadelphia, del.	2.41c to 2.51c
Birmingham, base	2.35c
*St. Louis, delivered	2.54c
San Francisco, c.i.f.	2.85c
Detroit, delivered	2.28½c

GALVANIZED NO. 24

*Pittsburgh, base	2.85c
*Gary, Ind. Harbor, base	2.95c
*Chicago, delivered	3.00c
*Philadelphia, delivered	3.06c to 3.16c
*New York, delivered	3.10c to 3.20c
Birmingham, base	3.00c
*St. Louis, delivered	3.19c
San Francisco, c.i.f.	3.50c

AUTOBODY NO. 20

Pittsburgh, base	2.65c to 2.75c

FURNITURE

Pittsburgh, No. 10 heavy	2.55c to 2.65c
Pittsburgh, No. 20 light	3.05c to 3.15c

TIN MILL BLACK NO. 28

Pittsburgh, base	2.30c to 2.40c
Gary, base	2.40c to 2.50c
St. Louis, delivered	2.77½c

HEAVY COLD ROLLED NO. 10

Pittsburgh, base	2.10c
Gary, Ind. Harbor, base	2.20c
Chicago, delivered	2.25c
Philadelphia, delivered	2.41c
New York, delivered	2.55c

COLD ROLLED NO. 20

Pittsburgh, base	2.60c
Gary, Ind. Harbor, base	2.70c
Chicago, delivered	2.75c
Philadelphia, delivered	2.91c
New York, delivered	2.95c

Wire Products

(Prices apply on straight carloads. Mixed and joint carloads take 10 cents higher price; pool carloads 25-cent advance; less carloads 40-cent advance.)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.95
Cement coated nails	1.95
Galvanized nails	3.95

(Per pound)

Polished staples	2.50c
Galvanized staples	2.75c
Barbed wire, gal.	2.60c
Annealed fence wire	2.35c
Galvanized wire	2.80c
Woven wire fencing (9-11 ga.)	$55.00
(12½ ga. and lighter)	$60.00

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Chicago and Anderson, Ind., $1 over Pitts.-Cleve.; Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Steel Plates

Pittsburgh, base	1.60c
Philadelphia, delivered	1.79½c
New York, delivered	1.90c
Boston, delivered	2.02c
Buffalo, delivered	1.85½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Birmingham, Ala., base	1.75c
Coatesville, Pa., base	1.70c
Pacific Coast, c.i.f.	2.00c
*St. Louis, delivered	1.94c

Structural Shapes

Pittsburgh, base	1.60c
Philadelphia, delivered	1.75c
New York, delivered	1.87c
Boston, delivered	2.00½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Lackawanna, N. Y., base	1.70c
Birmingham, Ala., base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base	1.60c
Chicago, base	1.70c
Birmingham, Ala., base	1.75c
Lackawanna, N. Y., base	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base	1.65c
Philadelphia, delivered	1.91c
New York, delivered	1.95c
Boston, delivered	2.02c
Pittsburgh, cold finish	1.75c
Pittsburgh, forg. qual.	1.85c
San Francisco, c.i.f.	2.10c

RAIL STEEL

Chicago Heights	1.50c
Eastern mills	1.35c

IRON

Chicago, base	1.60c
New York, delivered	1.85c to 1.90c
Philadelphia, delivered	1.81c to 1.86c
Pittsburgh, refined	2.70c to 4.20c

REINFORCING

Pitts., billet cut lengths	1.75c
Pitts., stock lengths, mill	1.60c
Chicago, billet	1.60c to 1.75c
Chicago, rail steel	1.30c to 1.45c
Philadelphia, cut lengths	1.86c
Cleveland, cut lengths	1.75c

Cold-Finished Bars, Shafting

Base, Pittsburgh

10,000 to 19,999 pounds	1.70c
20,000 to 59,999 pounds	1.65c
60,000 to 99,999 pounds	1.60c
100,000 pounds and over	1.57½c

Chicago, Cleveland, Buffalo 5c higher; Detroit, 20c; eastern Michigan 25c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Tin and Terne Plate

Per 100-pound box, Pittsburgh

Tin plate, coke base, cont.	$4.75
Tin plate, coke base, stock	3.85
Long ternes, 24, unassorted	2.80c

Gary, Ind., base 10 cents higher

Alloy Steel

Hot Rolled—F.o.b. Mills

Hot rolled; base 2.45c to 2.65c, mills; differentials to various consumers

S.A.E.	Alloy Diff.	4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
2000	0.25	5100 .80 - 1.10	
2100	0.55	Cr.	0.45
2300	1.50	51.00 Cr.	
2500	2.25	spring	0.20
3100	0.55	6100 bars	1.20
3200	1.35	6100 Spring	0.95
3300	3.80	Cr., Ni., Van.	1.50
3400	3.20	Carbon van.	0.95
4100 .15 to .25 Mo.	0.50	9250 (flats)	0.25
		9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot-rolled strip up to 23 15/16 in. wide, Pitts.	1.45c
Do., Chicago	1.55c
Do., del. Philadelphia	1.76c to 1.81c
Do., del. New York	1.80c to 1.85c
Cooperage hoop, Pitts.	1.55c to 1.60c
Do., Chicago	1.65c to 1.70c
Cold-roll, strip, Pitts., Cleve.	1.90c to 2.00c
Worcester, 3 tons over	2.20c

Rivets, Wrought Washers

Struc., c.l., Pitts.-Cleve.	2.25c
Struc., c.l., Chicago	2.35c
7/16-in. and smaller, Pitts., Chicago, Cleveland	70, 10 and 5 off
Washers, c.l., Pitts. dist.	$6.50 to 6.75 off
Do., Chicago district	7.00 to 7.50 off

Rails, Track Material

Standard rails, mill	$43.00
Relay rails, Pitts., 20 to 45 lbs.	$21.00 to 23.00
50 to 75	18.00 to 20.00
80 to 100	23.00 to 25.00
Light rails, 25-45, mills	$32.00
Light rails, Chicago	$34.00
Angle bars, mills	2.75c
Spikes, railroad, mills	2.40c
Spikes, boat, barge, Pitts.	2.65c
Track bolts, Chicago	3.50c
do., standard, jobbers	73 off list
Tie plates, Pitts.	$37.00
Tie plates, Chicago	$35.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 75 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 75 off
Tire bolts ..... 60 and 10 off
Stove bolts, 77½, 25 and 10 off in pkgs.; 86 off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 75 off

HEXAGON CAP SCREWS

Milled ..... 80-25 off
Upset 1 in. diam. and smaller 80-25-10 off

SQUARE HEAD SET SCREWS

Upset, 1 in. and smaller ..... 75-10-10 off
Headless set screws ..... 75-10 off
Upset, larger than 1 in. ..... 75-10 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh	$2.50
Do., less carloads, 5 kegs or over	$2.90
Less than 5 kegs	$3.05
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Steel sheet piling, Pitts.	1.90c

Bars

Better Buying Follows Railroad Activity — General Demand Shows Little Increase

BAR PRICES, PAGE 45

Chicago—Steel bar demand holds recent gains and business currently is in the best volume in several months. Orders usually involve small lots, but diversification in buying has resulted in a gradual increase in total tonnage. Farm implement manufacturers in convention here last week expressed optimism regarding the long term outlook but are conservative in predictions of activity over the remainder of the year. Bar orders from some farm equipment companies have been slightly heavier recently but no large immediate schedules are in prospect. Demand from automotive and railroad industries also is slow and has not shown the improvement noted in orders for miscellaneous buyers. The market generally is steady at 1.70c, Chicago.

Boston—Commercial bar buying is light, regular consumers taking small shipments at 1.60c, Pittsburgh. Tool steel and forging bars are also dull. Springfield, Mass., armory closed Oct. 17 on 150 tons of manganese acid steel.

Philadelphia—Steel bar demand is stimulated by better railroad buying, led by requirements of the Pennsylvania. General buying continues to lag, with market 1.60c, Pittsburgh. Common iron bars are holding at 1.50c to 1.55c, Pittsburgh.

Pittsburgh — Specifications for soft steel bars are better than in September and there were some good days last week from the standpoint of orders. Both orders and inquiries are for small lots. The base price of merchant bars is 1.60c; alloy material is 2.45c to 2.65c.

Cleveland—Bookings of commercial steel bars this month are double those of the comparable period in September. Chevrolet has issued some releases, but tonnage from the automotive industry and railroads still is in the prospective stage. Small, miscellaneous sales are fairly active, including orders from implement, machine tool and nut and bolt interests. Bars are firm at 1.65c, base, Cleve-Forge shops here are more active.

Cold-Finished Sustained By Small Lot Buying

Cold Finished Prices, Page 45

Pittsburgh—Aided entirely by small-lot orders, the cold-finished steel bar market continues at the same rate as during September for both specifications and shipments. Likelihood of important tonnage from the Detroit district appears remote. Jobbing and manufacturing outlets show no major change in demand for bars. The base price is unchanged at 1.70c, Pittsburgh, for five to ten ton lots. Orders over this size command the regular quantity allowances.

Tin Plate Operations Continue To Increase

Tin Plate Prices, Page 45

Pittsburgh—Tin plate mill operations in this district are up 5 points to 45 per cent, with indications this rate will be increased during the coming week. Shipments appear steady. The official price per base box of $4.75 for coke tin plate is continuing, with the price for 1933 to be announced within a few weeks.

Plates

Eastern Railway Buying Features Market—Run of Miscellaneous Orders Holding Up

PLATE PRICES, PAGE 45

Chicago—Miscellaneous plate orders reveal little change in tonnage and large lots still are lacking in new inquiry. Activity in municipal tank construction is lagging and oil companies are doing but little tank work. Railroads continue poor buyers of plates for car repairs, and car builders have little business on books.

Boston—Oil-burner builders are specifying sizable shipments and large tank work also is heavier. McClintic-Marshall Corp. booked a 200-ton tank for the Medfield state hospital. Repairs to locomotives and freight cars at the Reading shops of the New Haven railroad will take several hundred tons. Several hundred tons are up for the navy for Boston delivery. Prices are unchanged at 1.70c, Coatesville, Pa., but there is some shading.

New York—While there is a noticeable absence of large plate tonnage in the market, small consumers continue fairly active. An announcement by the Standard Oil Co. of New Jersey of a $20,000,000 improvement program over the coming year holds promise of substantial plate demand.

Phliadelphia—Buying by the Pennsylvania and Reading railroads dominates the eastern plate market. The former is now closing on 8500 tons of plates. The latter, in addition to having recently purchased approximately 1500 tons from three eastern Pennsylvania mills, is placing about 2200 tons.

Parrish Mfg. Co., Reading, Pa., is scheduled to do a portion of the fabricating work necessary in the Reading's car repair program. Miscellaneous buying is holding at the improved rate. The usual carlot price is 1.70c, Coatesville, Pa.

Pittsburgh—Plate fabricators are finding little business to figure. A tank at Peekskill, N. Y., will be fabricated by a local shop and may take 100 tons of plain material. Barge builders are figuring a few private inquiries. A local plate mill was rolling floor plates last week. A large proportion of the 14,000 tons of steel to be bought by the Pennsylvania railroad will benefit the plate mills.

Cleveland — Miscellaneous plate business is holding up to a fairly satisfactory level. Orders continue small; boiler shops taking little material. Plates are firm at 1.60c, base, Pittsburgh.

Contracts Placed

550 tons, water tank, Sheboygan, Wis., to Chicago Bridge & Iron Works, Chicago.

200 tons, tank, Medfield state hospital, Harding, Mass., to McClintic-Marshall Corp., Bethlehem, Pa.

125 tons, tanks, American Coal Co. Inc., East Hartford, Conn., to Chicago Bridge & Iron Works, Chicago.

100 tons, elevated tank, for Standard Brands Inc., Peekskill, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Unstated tonnage, standpipe, Waltham, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Contracts Pending

175 tons, two oil tanks, 17,600 barrel capacity each, navy for Cavite, P. I.; Chicago Bridge & Iron Co., Chicago, low for delivery points on east and west coasts, and also f.o.b. works.

171 tons, medium black, partial requirements, four destroyers; bids Oct. 25, to navy department, for delivery to Boston, Brooklyn, N. Y., and Philadelphia or f.o.b. works.

Railroads

Loan of $3,000,000 to B. & O. Presages New Cars and Repairs —Pennsylvania Placing Steel

TRACK MATERIAL PRICES, PAGE 45

Washington—Interstate commerce commission has approved a further loan of $3,000,000 to the Baltimore & Ohio railroad by the Reconstruction Finance Corp. It is estimated that $90,000 will be used for repair and rebuilding of 165 locomtives; $1,100,000 for repairs of 2500 freight cars and $1,460,000 for building 820 new all steel gondolas.

Steel requirements for these cars will total about 20,500 tons; 13,940 tons of plates, shapes and bars, 1640 tons of axles, 2460 tons of castings and 2460 tons of iron wheels. This will cover construction of 820 coal cars.

Boston—New York, New Haven & Hartford railroad will repair 160 freight cars and 93 locomotives at its Readville shops as the result of approval of the Reconstruction Finance Corp. of its application for a $700,000 loan.

Philadelphia — Pennsylvania railroad is closing on approximately 15,000 tons of plates, shapes and bars, for construction of 1285 freight cars in its own shops. Of this number of cars 925 will be steel box cars and 360 steel automobile cars of large dimensions. Of the latter, 250 will be 40 feet 6 inches long, while 110 will be 50 feet 6 inches long. According to a recent announcement, 485 will be built at the Altoona, Pa., shops, 400 at Pitcairn, Pa., and 400 at Enola, Pa. Actual construction is scheduled to begin Nov. 1. Casting contracts have been largely placed.

Reading Co., in addition to the award of about 1500 tons of plates over the past three weeks or so, is closing on approximately 2200 tons of additional work for its cark repair program. A portion of the fabrication work has been let to the Parrish Mfg. Co., Reading, Pa., with the plain material being bought through the railroads' purchasing offices.

Pittsburgh—Plate and structural mills expect the purchase daily of some 14,000 tons of car shapes and plates by the Pennsylvania railroad. Initial work on the 1285 cars to be built will begin about Nov. 1. The railroad has announced that 400 cars each will be built at Pitcairn, Pa., and Enola, Pa., while the Altoona, Pa., shops will construct 485 cars. Of the total, 925 will be steel box cars and 360 steel automobile cars. Heavy freight cars repairs at the Enola and Altoona shops will be made during the car construction work by transferring some of the former activity to Pennsylvania shops at Terre Haute, Ind., and Mahoningtown, Pa. Norfolk & Western will formally award 5000 tons of rails and about 1000 tons of spikes and tie plates this week. Mills participating in the business are reported to have been notified of their share.

Chicago—Steel orders from railroads are tending upward, but recent improvement has been insignificant. Orders for repair parts involve only small lots and increases in repair shop activity have been slight. Rail demand still is slow and prospects for large tonnages over the next several months are regarded as unfavorable. Releases of track material are small, while inquiry for freight cars and other equipment is lacking. Formal inquiry for 500 freight cars for the Chicago Great Western railroad is expected shortly, although it is doubted that locomotives will be purchased soon. Pacific Fruit Express is scheduled to close on underframes for which bids were received recently, while Western Fruit Express has placed 100 underframes with the Minneapolis Steel & Machinery Co.

Car Orders Placed

Navy, Lakehurst, N. J., two railroad type chassis, to Wellman Engineering Co., Cleveland.

Pennsylvania, 1285 box cars, to own shops; 400 each to Pitcairn, Pa., and Enola, Pa., with 485 to be built at Altoona, Pa., shops.

Western Fruit Express, 100 underframes, to Minneapolis Steel & Machinery Co., Minneapolis.

Car Orders Pending

Navy, delivery Fort Mifflin, Pa., three 50-ton capacity steel box cars; bids Oct. 25.

Panama Canal commission, one rail motor car, bids asked.

Wire Buying Steady with Prospects for Later Gain

Wire Prices, Page 45

Chicago—Shipments of wire products are steady, with incoming business showing no improvement over September. Fencing and barbed wire are moving slowly in the agricultural districts, while manufacturers' wire also is quiet. Some improvement in demand for the latter is looked for in certain directions over coming weeks. Prices generally are steady at $2 in carloads for wire nails and 2.25c for plain wire.

Worcester, Mass.—Wire mills are holding recent gains, although not large, and in some departments there is a slight increase in buying. Prices continue firm. G. F. Wright Steel & Wire Co., Worcester, is low on 29,500 square feet galvanized wire cloth for the navy, delivery to Boston, Brooklyn and Sewalls Point, Va., with a bid of $1097.20 and on 19,700 square feet for San Diego and Mare Island at $1327.50, both delivered.

New York—A somewhat better movement of nails from warehouses is reported but this has had little immediate bearing on mill shipments, which continue light. Nail prices are untested at $1.95, Pittsburgh. Plan bright wire is holding at 2.20c, Pittsburgh. Manufacturing requirements for wire are improved.

Pittsburgh—Wire mills find little change in specifications but shipments are reversing the upward September showing. Prices are firm at 2.20c for plain wire, $1.95 minimum for nails, and spring wire nominal at 3.20c. A few orders for nails from jobbers were placed last week.

Cliffs To Resume Mining; Ford Properties Suspended

Iron Ore Prices, Page 52

Cleveland — The Cleveland-Cliffs Iron Co. will reopen all its iron ore mines, with the possible exception of one, Nov. 1, on a 2-day-a-week schedule. Its mines have been practically idle since June 1. Employment will be given to about 1200. Other mining companies also are planning winter schedules with a view to providing work, rather than to produce ore. The Ford Motor Co. has temporarily suspended operations at its Blueberry mine, an underground property on the Marquette range, near Ishpeming, Mich., and has temporarily suspended operations at its Imperial mine, removing pumps. The Imperial is an old mine. The Ford company did not make its usual ore purchases in the open market this year. According to the Lake Superior Iron Ore association's current report, shipments from Lake Erie docks to interior furnaces to Oct. 1 were 1,867,370 tons; receipts, 1,793,977 tons, leaving a dock balance of 5,241,016 tons, compared with 5,973,654 tons, Oct. 1, 1931.

Structural Shapes

Awards Continue Downward, but Pending Tonnage Is Still Heavy—New Emergency Work May Not Reach Mills for Some Weeks—190,000-Ton Bridge Up

STRUCTURAL SHAPE PRICES, PAGE 45

New York — A large volume of small work for army posts in the East is up for bids, taking a fair tonnage of shapes. Most of the requirements in the federal government emergency program will not reach the steel mills for some weeks. Awards continue light, led by bridges and public work. For structural steel inspection, about 1500 tons for the Rochester, N. Y., postoffice, James G. Dempsey, Philadelphia, is low at 23c a ton.

Boston—Structural awards are in small lots. Prices bid recently on the Wellesley bridge superstructure, taking about 750 tons, brought out a low of $48,598.51 by the Boston Bridge Works Inc., that firm taking the contract. Probably less than 1500 tons are active in the district. Blakeslee Rollins Corp., Boston, is low on the Point of Pines bridge substructure, taking about 500 tons of piling. For a bridge cut-off in Connecticut 350 tons were placed.

Philadelphia — Specifications for the proposed 8500-ton customs house here are being issued, with bids to be opened Nov. 16. Approximately 1000 tons for the Benning bridge, Washington, are reported placed. New inquiry includes a few hundred tons for Pennsylvania state bridge work, bids opened Oct. 14. Shapes are unchanged at 1.70c, nearest mill.

Pittsburgh—Tonnage entered for fabrication in local shops is light. Pennsylvania state highway awards continue frequent with the next, Oct. 28, to include a 132-ton plate girder span in Greene county. State highway commission of West Virginia is seeking federal approval of a bridge to cross Middle Island creek, St. Marys, W. Va. Fabricated prices continue erratic. The nominal price of 1.60c, mill, for plain material has not been changed. Federal engineers closed bids Oct. 14, for locks No. 2 and No. 3, Allegheny river, which include over 1000 tons.

Cleveland—New structural shape awards and projects are fairly numerous, but individual tonnages still are small. Wellman Engineering Co., Cleveland, has booked an order for a dirigible mooring mast, for the government field at Sunnyvale, Calif., taking 750 tons of shapes. For two warehouses for the W. K. Kellogg Co., Battle Creek, Mich., 100 tons will be required. Plain shapes are steady at 1.60c, base, Pittsburgh.

Chicago—New bids are to be taken on the 1800-ton bridge at Ottawa, Ill., and one at Joliet, Ill., requiring 1000 tons. Another Illinois bridge will take 250 tons while a bridge at Kansas City, Mo., requires 1500 tons. Recent awards consist principally of small lots for highway bridges.

For inspection of approximately 5000 tons of structural steel for the Minneapolis postoffice, being fabricated by the Worden-Allen Co., Milwaukee, James G. Dempsey, Philadelphia, is low at 15c a ton.

Contracts Placed

750 tons, postoffice, Jamaica, N. Y., to George A. Just Co., Brooklyn, N. Y.; Rego Building Corp., Brooklyn, general contractor.

750 tons, mooring mast, Sunnyvale, Calif., dirigible base, to Wellman Engineering Co., Cleveland.

450 tons, highway bridges, Alfalfa and Beckham counties, Oklahoma, to Hackney Iron & Steel Co., Enid, Okla.

425 tons, postoffice, Flushing, N. Y., to George A. Just Co., Brooklyn, N. Y.; Rego Building Corp., Brooklyn, general contractor.

400 tons, three bridges, Yorktown, Va., to McClintic-Marshall Corp., Bethlehem, Pa.; Sanford & Brooks Co., Baltimore, general contractors.

400 tons, school, Middleburg, N. Y., to Shippers' Car Line Corp., Milton, Pa.; Bedford Construction Co., Utica, N. Y., general contractor.

390 tons, bridge for department of agriculture, Lee Hall, Va., to McClintic-Marshall Corp., Bethlehem, Pa.

380 tons, bridge, Barnum avenue, Stratford, Conn., to American Bridge Co., New York; through Mariana Construction Co. Inc., New York.

300 tons, bridge, Lawrence county, Pennsylvania, to McClintic-Marshall Corp.; through Kline Contracting Co., Butler, Pa.

310 tons, highway bridge, Sufferon, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

225 tons, building, University of Florida, Gainesville, Fla., to Ingalls Iron Works Co., Birmingham, Ala.; Paul Smith Construction Co., Haines City, Fla., general contractor.

210 tons, highway bridge, Webster county, Iowa, to Des Moines Steel Co., Des Moines, Iowa.

190 tons, sheet piling, weir, Colusa, Calif., to unnamed interest.

180 tons, bridge over Erie railroad, route 2, section 9, Ramsey, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.; through Senior & Palmer Inc.

160 tons, highway bridges, Clayton and Allamakee counties, Iowa, to Clinton Bridge Works, Clinton, Iowa.

157 tons, bureau of roads and bridges, Yakima county, Washington, to Poole & McGonigle, Portland, Ore.

150 tons, highway bridge, Henderson county, Illinois, to Vincennes Bridge Co., Vincennes, Ind.

150 tons, bridge, Owsley county, Kentucky, to Mt. Vernon Bridge Co., Mt. Vernon, O.

145 tons, foundations for west-side elevated highway, New York, to American Bridge Co.; through Necara Co. Inc., New York.

130 tons, highway bridge, Emporium, Pa., to Ft. Pitt Bridge Works, Pittsburgh.

130 tons, including an 80-ton bridge, awarded through Charles Brosser, Pittman, N. J., to an unnamed fabricator; and 50 tons for a church at Oxford Circle, Philadelphia, awarded to Lehigh Structural Steel Co., Allentown, Pa.

130 tons, highway bridge, Laramie, Wyo., to Minneapolis-Moline Power Implement Co., Minneapolis.

100 tons, bridge, Wellesley, Mass., to Boston Bridge Works Inc., Boston.

100 tons, dairy building, World's fair, Chicago, to Gage Structural Steel Co., Chicago.

Awards Compared

	Tons
Awards, week ended Oct. 15	6,712
Awards, week ended Oct. 8	9,934
Awards, week ended Oct. 1	10,764
Awards, this week in 1931	15,137
Av. weekly awards, 1931	34,236
Av. weekly awards, 1932	14,989
Av. weekly awards, Sept	10,688
Awards to date, 1931	1,576,419
Awards to date, 1932	629,570

Contracts Pending

170,000 tons, shapes, cable and castings, San Francisco-Oakland bridge; bids soon.

8500 tons, United States customs house, Philadelphia; bids to be opened Nov. 16.

1800 tons, bridge, Ottawa, Ill.; new bids to be asked.

1500 tons, Seventh street bridge, Kansas City, Mo.

1200 tons, postoffice, Norfolk, Va.

1150 tons, bridge, Mississippi river, Savanna, Ill., to Sabula, Iowa, for Savanna-Sabula Bridge Co., $190,000 loan authorized by Reconstruction Finnce Corp. Also, $4000 worth of tools and equipment.

1100 tons, state bridge, Tuolumne river, near Modesto, Calif.; bids Oct. 26.

1000 tons, McDonough street bridge, Joliet, Ill.; new bids to be asked.

1000 tons, inspection shed, New York.

900 tons, addition and buildings, marine hospital, Norfolk, Va.; bids Nov. 14.

800 tons, bridges, Virginia & Western railroad.

700 to 1400 tons, underframes, Pacific Fruit Express Co., San Francisco; bids opened.

600 tons, Chrysler building, World's fair, Chicago; Nydele Building Construction Co., Chicago, awarded general contract.

500 tons, Biggs Memorial hospital, Ithaca, N. Y.; bids Oct. 20.
400 tons, postoffice, Portland, Me.; Poorvu-Heenan Construction Co., Boston, low.
400 tons, shapes and bars, postoffice, Beaumont, Tex.; Algernon Blair, Montgomery, Ala., low.
400 tons, bridge and miscellaneous highway work, Kingston, N. Y.
400 tons, Jewish hospital addition, Philadelphia; opening of bids deferred to Oct. 18.
4000 to 5000 tons, previously reported as 10,000 tons, Caughnawaga bridge, Quebec; contracts to be closed this month by Caughnawaga Bridge commission, Montreal, Que.
400 tons, bridge, Raymond, Wash.
375 tons, postoffice, Binghampton, N. Y.
350 tons, addition to plant, Bear Brand Hosiery Co., Kankakee, Ill.
300 tons, state bridge work at Lehighton, Stroudsburg, Mt. Pocono, and Lepape, Pa.; bids Oct. 14, at Harrisburg, Pa.
250 tons Sears, Roebuck & Co. building, World's fair, Chicago; general contract awarded to B-W Construction Co., Chicago.
250 tons, angles, channels and I-beams, four destroyers, Nos. 352, 353, 354 and 355; bids to be taken Oct. 25 for delivery to Boston, Brooklyn, N. Y., and Philadelphia, or f.o.b. works.
250 tons, highway bridge, Lincoln, Ill.
200 tons, postoffice, Daytona Beach, Fla.; bids Nov. 9.
160 tons, hospital building, Brookline, Mass.
150 tons, galvanized structural steel towers, for department of agriculture, Washington; International-Stacey Corp., Columbus, O., low.
132 tons, plate girder bridge, Greene county, Pennsylvania; bids at Harrisburg, Pa., Oct. 28. Included 23 tons of plain steel bars.
110 tons, steel sheet piling, Panama; United States Steel Products Co. low; bids Oct. 11.
100 tons, two warehouses, W. K. Kellogg Co., Battle Creek, Mich.
100 tons, state highway bridge, Weyauwega, Wis.; Wisconsin Bridge & Iron Co., Milwaukee, low.
100 tons, state bridge work, Port Royal, Pa.; Bethlehem Fabricators Inc., Bethlehem, Pa., low.
100 tons, shapes and bars, postoffice, Palmer, Mass.; bids Oct. 27.

Semifinished Steel Sales Gaining Slowly

Semifinished Prices, Page 52

Sales and shipments of semifinished steel have improved moderately. Open-hearth operations in the Youngstown district now include 22 units, about 20 per cent of capacity. Sheet bars, billets and slabs are firm at $26, base, Pittsburgh, Youngstown, O., and Cleveland. More activity is noted in demand for forging billets, at $33, Pittsburgh. Wire rods are $37.

Byers Shuts Down Plant

Pittsburgh—Production at the Economy, Pa., plant of A. M. Byers Co. ceased temporarily Oct. 7 after a run of one week.

Concrete Bars

Bids To Be Taken Soon on 20,000 Tons for San Francisco-Oakland Bridge—Public Work Still Supplies Bulk of Tonnage—Demand for Welded Mesh Is More Active

REINFORCING BAR PRICES, PAGE 45

New York — Highways, bridges and hospitals furnish the bulk of pending reinforcing steel tonnages. Demand for welded mesh continues active with New York and New Jersey highway construction heavy for this period. Pittsburgh district mills continue to take a good part of the mesh placed. Cut bars are steadier at 2.10c, New York, but buying is slack.

Boston—Requirements for highways and small bridges furnish the bulk of demand for reinforcing steel. The Wheeling, W. Va., mill took 200 tons for a highway in Connecticut. Simpson Bros., Boston, will buy a good tonnage for another state highway section in Wellesley, Mass.

Philadelphia—Reinforcing bar orders have been uniformly small the past week, with little in sight. Billet steel bars and cut lengths continue 1.55c, Pittsburgh, while rail steel bars are 1.35c, base, eastern mill.

Pittsburgh—Pennsylvania department of highways closes bids Oct. 27 for reinforced concrete pavement work in nine Pennsylvania counties and bids will be closed Oct. 28 for similar work in eight other counties. Some steel bars and mesh will be required. Mill shipments of reinforcing bars are running ahead of September but specifications are slightly less.

Cleveland — Interest in the reinforcing bar market here is centered in plans for the superstructure for the Cleveland postoffice, now out for bids Nov. 15, and which may require as much as 300 tons of bars in addition to the 10,000 tons of shapes, previously reported. A few small awards have been made recently for road work.

Chicago—Road work is providing the principal source of activity for reinforcing bars. Private projects are few and will require only small lots. Demand in the immediate Chicago district is dull. Prices continue unsteady and on some recent road work sharp concessions have been made.

Awards Compared

	Tons
Awards, week ended Oct. 15	2,633
Awards, week ended Oct. 8	5,003
Awards, week ended Oct. 1	2,769
Awards this week 1931	14,001
Av. weekly awards 1931	6,808
Av. weekly awards, 1932	4,149
Av. weekly awards, Sept	4,523
Awards, to date, 1931	298,598
Awards, to date, 1932	173,910

Contracts Placed

650 tons, postoffice, Cincinnati, to J. E. Smith Co., Cincinnati; through Consolidated Engineering Co., Baltimore, general contractor.
300 tons, highway, route 48, section 25, Pleasantville, N. J., to Truscon Steel Co., Youngstown, O.; through S. J. Groves & Sons Co., New York.
200 tons, three bridges, Yorktown, Va., to Virginia Steel Co., Richmond, Va.; Sanford & Brooks Co., Baltimore, general contractor.
200 tons, quarters and barracks, Fort Clayton, Canal Zone, to Southern General Fireproof Co., Atlanta, Ga.; Winston Bros. Co., Minneapolis, general contractor. Structural and miscellaneous ironwork still pends.
180 tons, highway, route 38, section 2, Burlington county, New Jersey, to Truscon Steel Co., Youngstown, O.; through Bergen Construction Co., New York.
168 tons, Sunrise highway extension, including grade separation at county highway No. 1841, Belmont trail and Deer Park avenue, Maywood, N. Y., to National Bridge Co., Long Island City, N. Y.; Anita Construction Co., New Hyde Park, N. Y., general contractor.
150 tons, plant alterations, Kops Bros., Ozone Park, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh, through Turner Construction Co., New York.
145 tons, three bridges, route 2, section 6, Rochelle Park, N. J., to Fireproof Products Co.; through I. B. Miller Inc., New York.
130 tons, yard service building, Union Terminal, Cincinnati, to Truscon Steel Co., Youngstown, O.; through Frank Messer & Sons, Cincinnati, general contractor.
110 tons, reformatory, Elmira, N. Y., to Kalman Steel Corp., Bethlehem, Pa.
100 tons, swimming pool, Scripps college, Claremont, Calif., to Truscon Steel Co., Los Angeles.
100 tons, bridge, Figuerora street, Los Angeles, to Soule Steel Co., Los Angeles.
100 tons or more, elementary school 48, Baltimore, to Armstrong & Parker Inc., Baltimore; P. C. Strett Engineering Co., Baltimore, contractor.
100 tons, highway, Annsville-Peekskill cutoff, Westchester county, New York, to Concrete Steel Co., New York;

A. E. Ottaviano Inc., Croton-on-Hudson, N. Y., contractor.

Contracts Pending

20,000 tons, San Francisco-Oakland bridge; bids soon.
3827 tons, San Gabriel Dam No. 1, Los Angeles; bids rejected.
465 tons, state highway work in Santa Clara county, California; bids Oct. 26.
325 tons, state bridge, Tuolumne river near Modesto, Calif.; bids Oct. 26.
200 to 300 tons, estimated, Cleveland postoffice; bids Nov. 15.
135 tons, bureau of roads and bridges, Jackson county, Oregon; Curtis-Gardner Co., Portland, Oreg., low.
Unstated tonnage, two warehouses, W. K. Kellogg Co., Battle Creek, Mich.

Refractory Buying Gains; Needs Are Imparative

Refractories Prices, Page 52

Pittsburgh—Refractory brick consumers ordered slightly more material in September than for any of three months previously. So far in October, specifications for fire clay brick, while spotty, have been gratifying. Every order carries rush delivery demands. The price of $35 per 1000 for first quality and 25 for second quality remains nominal with likelihood of an advance before the end of 1932. Magnesite and chrome brick prices are unchanged at $61.50 and $42.50 per net ton, respectively.

Bolt, Nut Buying Shows Some Broadening Signs

Bolts, Nuts, Rivets Prices, Page 45

Pittsburgh—In the past ten days bolt and nut specifications have been broader and include some fair railroad orders. Jobbers continue to be heard from frequently, because of depleted stocks. Award of some 500 tons of bolts, nuts and rivets for the Pennsylvania railroad is expected and probably 1000 tons of the same products are involved in the belt line bridge, New Orleans, closing soon.

New York—A small but perceptible increase is noted in demand for bolts and nuts, notwithstanding the fact no sizable order has been reported here since the Cunard line placed about 100 tons of bolts, spikes and washers, for one of its local piers a month ago. Railroads are buying a little more freely and in some manufacturing lines improvement is noted.

Chicago—Bolt, nut and rivet specifications show no improvement compared with the rate a month ago. Orders from larger users are light and generally unchanged. Railroads are poor buyers and jobbers are making little increase. Prices are holding well at 75 off for bolts and nuts and 2.35c, Chicago, for large rivets.

Cleveland—Railroad releases for nuts, bolts and rivets continue to improve; most tonnage in rivets especially coming from car shops. Though automotive users have placed contracts for nuts and bolts, their releases have not picked up, and not much improvement is expected before Nov. 1. The southern jobbing trade in nuts and bolts continues a bright spot in the market. A few small nut and bolt manufacturers are offering price concessions as much as 25 to 30 per cent below the usual quotations.

Pipe

Federal Loans Reviving Demands in Some States—Large Tonnage for Seattle Project

PIPE PRICES, PAGE 63

New York—New inquiry for cast pipe is for small lots only, with Yonkers, N. Y., taking bids on close to 100 tons additional after placing a tonnage with the Emaus, Pa., foundry recently. Prices are firm at around $30, eastern foundry, with operations scarcely better than 40 per cent in most instances.

Boston—Cast pipe demand is mainly for small shipments. Middleboro, Mass., bought about 150 tons of 6-inch from the local foundry. Building construction is taking little steel or wrought iron material.

Washington—The Reconstruction Finance Corp. has approved a loan of $1,491,000 to Seattle, for municipal work requiring 3500 tons of cast pipe, and 4800 feet of 78-inch steel pipe.

Pittsburgh—Demand for tubular products still is limited to routine small orders. Producers are experiencing only moderate improvement this month. A 20-inch line for the Standard Oil Co. of New Jersey in northern Pennsylvania has failed to develop. Prospects of line pipe purchasing this year are remote. One pipe mill reports diversified inquiries and slightly larger individual orders. Wheeling Steel Corp. is resuming in several pipe mills at Benwood, W. Va., Oct. 17.

Cleveland—A substantial tonnage of steel pipe will be required for the Cleveland postoffice, on which bids are to be closed Nov. 15. Pipemakers now are figuring sizes from plans, just issued. Warehouse orders for pipe are well sustained.

Chicago—Wilmette, Ill., has received a federal loan for construction of a waterworks requiring around 700 tons of cast pipe. Bids on this work were taken a number of months ago but construction was delayed and new bids are expected to be asked. Federal aid also has been approved for a number of small waterworks and filtration plant projects in Kentucky and Ohio. Cast pipe orders recently have been extremely light and inquiry lacks improvement. Prices are receiving but little test but generally are steady.

Birmingham, Ala.—Cast pipe awards are infrequent, and tonnage has not increased. Some of the larger shops here are down completely at times. Federal aid to cities may revive demand.

Cast Pipe Placed

100 tons, 4 to 10-inch class 150, Anaheim, Calif., to United States Pipe & Foundry Co., Birmingham, Ala.

Steel Pipe Placed

145 tons, steel and wrought iron, plumbing and heating, veterans' hospital, Fayetteville, Ark., to National Tube Co., Pittsburgh, and Reading Iron Co., Reading, Pa., through Monroe Hardware Co., Monroe, La.; W. J. Riley, Monroe, general contractor.
Unstated tonnage, 65,000 feet, 2-inch and under, galvanized steel or wrought iron, Panama, to United States Steel Products Co., $5696.10, delivered; bids Sept. 16. Also awarded 600 feet, 1½-inch extra strong black.

Cast Pipe Pending

3500 tons, Seattle; loan authorized by Reconstruction Finance Corp.
228 tons, 4 to 10-inch class 150 and 250, Fresno, Calif.; bids opened.
660 tons, water department, Cincinnati; bids Oct. 18.

Steel Pipe Pending

450 tons, small size, Consolidated Gas Co., Baltimore; bids asked.
250 tons, water department, Cincinnati; bids Oct. 18.
Unstated tonnage, 4800 feet, 78-inch, Seattle; loan by Reconstruction Finance Corp. authorized.
Unstated tonnage, 1100 steel boiler tubes, navy, Puget Sound, Wash.; National Tube Co., Pittsburgh, low; bids Oct. 4.
Unstated tonnage, 100,000 feet, ½-inch rigid steel conduit, galvanized or cadmium plated, Panama; Laclede Tube Co., St. Louis, low, $4467, delivered; bids Oct. 11.
Unstated tonnage, 1500 feet, 20-inch steel shore discharge pipe, United States engineer, Jacksonville, Fla.; bids Oct. 24.

Strip

Hot-Rolled Buying Shows Some Increase — General Demand Larger Than During September

STRIP PRICES, PAGE 45

Pittsburgh—Carload strip steel orders are more frequent from customers who a month or so ago specified in pound lots. This improvement applies only to hot-rolled strip, as cold-rolled and specialty finishes, such as rustless, continue quiet. Automotive orders are not expected to improve greatly during October. The hot-rolled base is 1.45c, Pittsburgh, with cold-rolled strip 1.90c to 2.00c.

Boston—Cold-rolled strip demand is mostly in small lots of narrower widths, but there has been some gain in the number of orders. Prices are unchanged. Washburn Wire Co., Phillipsdale, R. I., has booked 57,000 pounds of cold-rolled strip, 0.025-inch thick, 1.3125 inches wide, in continuous rolls of approximately 100 pounds, at 6.2c, delivered Picatinny arsenal, N. J.

New York—Strip business has fallen off somewhat here, with less buying from the textile industry. Hot-rolled strip is 1.45c, Pittsburgh, and cold-rolled 2.00c, Pittsburgh.

Philadelphia—Strip buying here has declined gradually during the past two weeks. Sellers look for little early improvement. Prices are unchanged, but largely untested at 1.45c, Pittsburgh, for hot-rolled in car lots, and 2.00c for cold-rolled.

Youngstown, O.—Running parallel to enlarged demand for steel sheets is a broadening volume of strip requirements. Some of this increase is from automotive sources, but a considerable portion from miscellaneous users. Hot-rolled material continues to have the edge on narrower cold-rolled strip.

Cleveland—Strip inquiries and sales have subsided, following a spurt the latter part of September and the first week in October. Tonnage so far this month is ahead of that for September for the comparable period, by a slight margin. Recent shipments to automotive interests have been figured in pounds instead of tons. Chevrolet has issued some moderate releases for Oct. 17. Hot-rolled strip is firm at 1.45c to 1.50c, base, Pittsburgh, to large and small consumers, respectively; cold-rolled is quoted 1.90c, base, Cleveland, by some mills, with others holding to 2.00c.

Chicago—Strip demand is slow to show additional improvement, although activity continues at a better rate. Occasional increases are noted in automotive requirements, but orders from miscellaneous users provide the chief support to current business. Mill operations hold around 10 per cent. Prices are fairly steady.

Chicago and Pittsburgh Lift Steel Rate to 19.5

Pittsburgh—Steel ingot operations gained another point last week to 17 per cent, two leading mills operating at 19 and 17 per cent, respectively. Operations by small independents are variable, with no major expansion noted. Nine out of 53 steelworks blast furnaces in operation, No. 1 Soho of Jones & Laughlin being removed from the potential list. Of the nine active, four belong to United States Steel Corp. The forecast for ingot operations this week is a continuation of 17 per cent.

Operations, week ended Oct. 15	**19.5**
Operations, week ended Oct. 8	**19**
Operations, week ended Oct. 1	**18**
Operations, one year ago	**28**
High for 1932, Feb. 6	**28.5**
Low for 1932—July 9	**12**

The Benwood plant of the Wheeling Steel Corp. was to resume on full time Oct. 17. Six mills at the Yorkville plant resumed Oct. 12.

Philadelphia—Eastern steelmaking operations are off one point to about 14 per cent. One leading interest has again shut down the only two open hearths it had in operation.

Buffalo—Steelworks operations in the week ended Oct. 15 represented 13 per cent, but in the current week, with eight open hearths scheduled, the rate will go to 19 per cent. The expansion is largely by Republic Steel Corp.

Youngstown, O.—Steelmaking operations are holding unchanged at about 19 per cent. It appears that this rate will carry through this week. Republic Steel Corp. has resumed on five sheet mills at Niles, O. The Mahoning Steel Co. plant at Niles also has reopened.

Cleveland—Steel ingot production for the week ended Oct. 15 continued at 23 per cent, and is scheduled at this rate this week. This is the seventh consecutive week at 23 per cent; some improvement appears in sight toward the close of October, if finished steel shipments continue at their present rate. Corrigan, McKinney Steel Co., though operating only three open hearths, is understood to be consuming ingot tonnage equivalent to production from four; American Steel & Wire Co., also continuing with three, is reducing its stocks. Otis Steel Co. has two open hearths active.

Chicago—Ingot output during the past week averaged around 18 per cent, a slight increase over the preceding week's rate. Blast furnace operations were unchanged at eight active stacks out of 36. Mills anticipate only small gains in the near future, based on the recent volume of incoming business.

Birmingham, Ala.—Despite some fluctuations in capacity being operated, the steelmaking rate by this district holds at about 30 per cent.

Warehouse Buying Shows Steady but Slow Gain

Warehouse Prices, Page 63

Philadelphia—Warehouse demand, following a fair rebound about a week ago, has receded, with the outlook for the remainder of this month beclouded. Prices are unchanged.

Pittsburgh—Jobbing in heavy finished steel products receded the early part of last week after a good volume the week before. Orders are more numerous for flat-rolled products.

Detroit—Warehouse business in iron and steel is holding thus far in October at about the same rate as September. Requirements from tool and die shops for material in connection with new models have been generally satisfied by this time. The trade continues confident that it is heading into an era of recovery.

Cincinnati—A recent increase in aggregate tonnage of warehouse sales through small individual orders indicates October will show a fair increase over September. Demand is broad but includes little structural material. Prices are unchanged.

Chicago—Sales are holding well at the recently improved rate and October gives indications of exceeding September business slightly. Prices are fairly steady.

St. Louis—Business of warehouses continues irregular both with reference to locality and commodities. In the immediate past, however, volume has increased.

RAW MATERIAL PRICES

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$15.50
Pittsburgh, dist. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
Philadelphia, delivered	13.76 to 14.26
Virginia furnace	17.25
Granite City, Ill., fur.	16.50 to 17.50
Buffalo, fur., local del.	16.00
Buff., all-rail, Boston	18.91 to 19.91
Buff., all-rail, Brooklyn	**18.90**
Buff., all-rail, Newark	**17.28**
Ala., Bir. fur., local del.	11.00
Ala., Nor. del., Bir. base	10.00
Alabama, del. Chicago	16.01
Alabama, del. St. L.	14.42
Alabama, del. Cincinnati	13.82
Ala., Phila., dock del.	15.00 to 15.25
Ala., Balt., dock del.	15.00
Alabama, New York dock	15.50
Ala., Boston dock del.	15.75 to 16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	13.82
Montreal, delivered	23.00 to 23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo fur., local del.	16.50
Buff., all-rail, Brooklyn	**19.40**
Buffalo, all-rail, Newark	**17.78**
Buff., all-rail, Boston	19.91 to 20.91
Virginia furnace	17.75
Eastern, del. Phila.	14.26 to 14.76

FOUNDRY, NO. 1X

Buffalo fur., local del.	17.50
Eastern, del. Phila.	14.76 to 15.26

MALLEABLE

Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
Pittsburgh dis. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Chicago, furnace	15.50
Buffalo fur., local del.	16.50
Eastern Penna., delivered	16.13 to 19.41
Granite City, Ill., fur.	16.50 to 17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	14.00
Pittsburgh, delivered	14.63 to 15.13
Eastern Penn., del.	13.50
Buffalo fur., local del.	15.50 to 16.00
Montreal, delivered	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	14.50 to 15.00
Pittsburgh, furnace	15.00
Pittsburgh, delivered	15.63 to 16.13

LOW PHOS.

Valley fur., standard	25.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	21.50 to 23.00

GRAY FORGE

Valley furnace	14.00
Pittsburgh district fur.	15.00
Pittsburgh, delivered	15.63 to 16.13

CHARCOAL

Lake Superior, del. Chicago	23.04

SILVERY

Jackson County, O., fur. in per cents: 6—$18; 7—$18.50; 8—$18.75; 9—$19; 10—$19.50; 11—$20; 12—$20.50; 13—$21.50; 14—$22.50; 15—$23; 16—$24; 17—$25.50.

Pittsburgh and Buffalo furnace: 7 to 10—$19.50; 15—$23 to $24.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents: 10—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Coke

Prices Per Net Ton

BEEHIVE OVENS

Connellsville furnace	$2.00 to 2.15
Connellsville foundry	2.75 to 4.25
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.21 to 8.81
Chicago, ovens, outside del.	7.00
Chicago, del.	7.75
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.50
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, O., ovens Connell., basis	4.50
Buffalo, ovens	7.50 to 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania New Jersey furnaces

(Nominal)

Foundry and basic, 56-63%, contract	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

(Nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50 to 9.00
North African low phos.	7.50 to 8.50
Swedish basic, 65%	7.50 to 8.00
Swedish low phos.	9.00
Spanish, North African basic, 50 to 60%	7.00 to 8.00
Newfoundland fdy., 55%	8.00
Tungsten, spot, short ton unit, duty paid	$10.00 to 10.25
Chrome ore, 48% gross ton c.i.f.	$17.00 to 18.00

Manganese Ore

(Nominal)

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55%	24 cents
South African, 52%	**22 to 23 cents**
South African, 49-51%	**21 to 22 cents**
South African, 44-47%	**20 to 21 cents**
Indian, 48-50%	22 cents
Brazilian, 46-48%	18 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Maryland, Georgia, Alabama	$35.00
Missouri	35.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	25.00 to 30.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	$35.00
Joliet and East Chicago	**47.00**
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

Burned, 9 x 4½ x 2½	$61.50
Unburned, 9 x 4½ x 2½	52.00

CHROME BRICK

Per Net Ton

F.o.b. shipping point	$42.50

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	38.00
Domes, Chewelah, Wash., base	20.90

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$26.00
Pittsburgh, bassemer	26.00
Youngstown	26.00
Cleveland	26.00
Philadelphia	31.75
Chicago	26.00 to 28.00
Forging, Chicago	**33.00**
Forging, Pittsburgh	33.00
Forging, Philadelphia	37.75

SHEET BARS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00
Chicago	28.00

SLABS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00

WIRE RODS

Pittsburgh, Cleveland	$37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.50c to 1.60c

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82%, tidewater, duty paid	$68.00
Ferromanganese, del. Pittsburgh	73.24
Spiegeleisen, 19-20%, domestic fur. spot†	25.00
Ferrosilicon, 50 per cent, freight all., c. l.	77.50
Do, less carload	85.00
Do, 75 per cent	126.00 to 136.00
Silicomang., 2½% carb.	105.00
2% carbon	110.00
1% carbon	115.00
(The above for spot carlots. Contract price $5 a ton less).	
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do, for spot delivery	10.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb. contained, on analysis	3.05 to 3.30
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic per ton carload, 23-26% f.o.b. Anniston, Ala.; 24%, $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60 per cent. per lb.	0.95
Cal. Molybdate, lb. cont.	0.80
Molybdate, lb. cont.	0.80

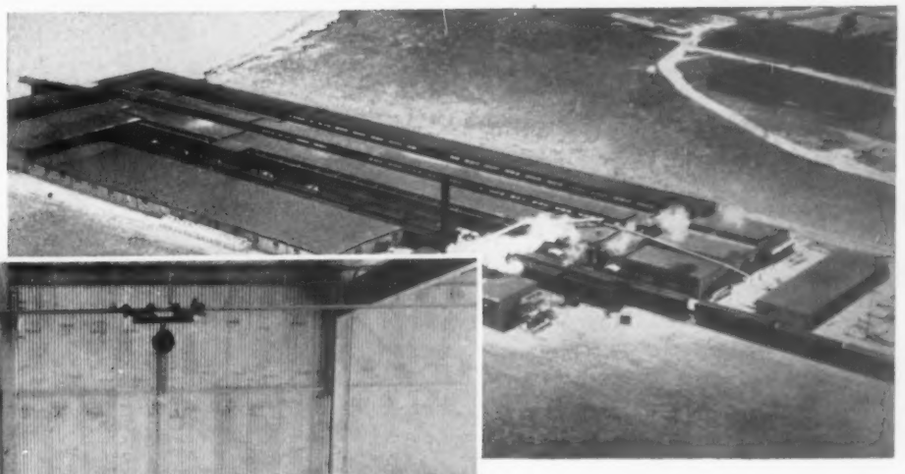
†Carloads. Differentials apply to quant.

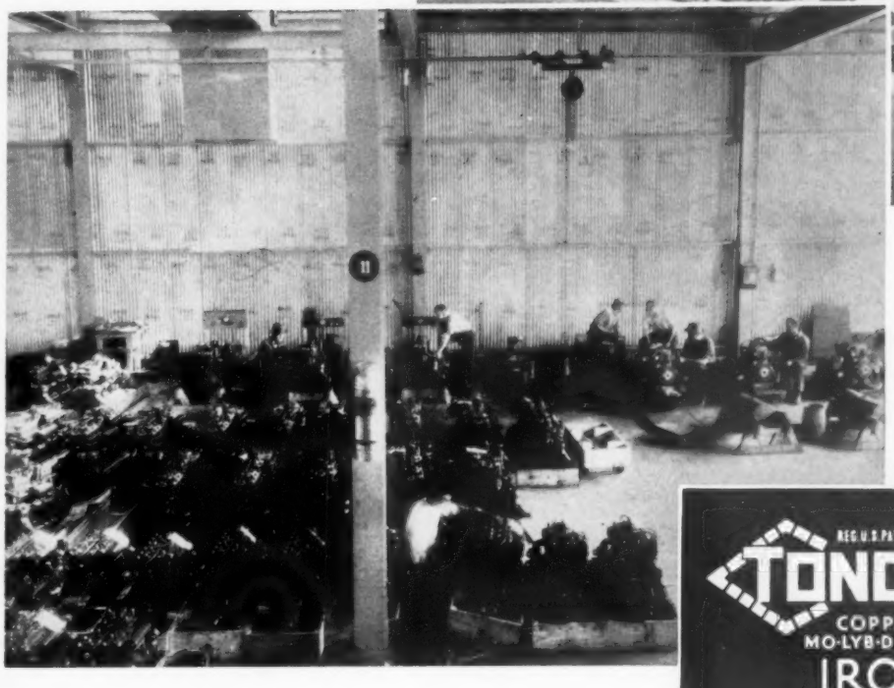
Fluorspar

85 and 5 per cent grade

Washed gravel, f.o.b. Ill., Ky., net ton car loads	$12.00
Washed gravel, import duty paid tide, gross ton	18.50

TONCAN IRON
COMBATS CORROSION IN INDUSTRIAL BUILDINGS.





Toncan Iron Siding on Motor Testing Room, Dodge Boat & Plane Co., Newport News, Va.

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COPPER
MO-LYB-DEN-UM
IRON

Sheet metal siding and roofing on industrial buildings must often withstand double attack. They must battle Nature's forces on the outside —rain, snow, sun, and wind—while on the inside oftentimes gases from industrial processes take their toll.

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Time has proved the merits of Toncan Iron—its longer life, its lower cost per year of service. And all because it is a modern alloy of scientifically refined iron, copper and molybdenum with a resistance to rust among the ferrous metals exceeded only by the stainless irons and steels.

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REPUBLIC STEEL CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

Pig Iron

Twenty Thousand More Tons of Basic Placed in East—Shipments Are Well Sustained

PIG IRON PRICES, AGE 52

Pittsburgh—Wheeling Steel Corp., Wheeling, W. Va., and Davison Coke & Iron Co., Neville Island, Pa., are commencing shipments on the pig iron order recently placed with them by the Allegheny Steel Co., Brackenridge, Pa. The total order amounted to over 20,000 tons of basic, most of it going to the Wheeling company. The price is reliably reported to be between $12 and $13 per ton, delivered, via all-water route.

Small pig iron orders were more active last week. However, the situation is spotty and shipments are far from sustained. Several hundred tons will be required for castings in the No. 2 lock and dam, Allegheny river, bids on which were received Oct. 14 by the district federal engineers. Nominally, $15 base, is the foundry malleable and bessemer market, with basic iron $14.

The Shenango Furnace Co. will blow out its Sharpsville stack this week, after one month's operation on bessemer.

Boston—One ship arrived with 250 tons of Indian pig iron last week. The foundry melt has increased slightly. Prices are unchanged, with Dutch iron offered under $13.50, Providence, R. I., and eastern Pennsylvania iron $16.50 and probably lower delivered in southern New England.

New York—Pig iron sales still are confined largely to single carlots. Little sizable tonnage is pending. Buffalo iron is moving into this district at around $14, furnace, and eastern Pennsylvania iron at $13 to $13.50, furnace.

Philadelphia—Pig iron buying has been bolstered considerably by the award of 20,000 tons of basic by a Coatesville, Pa., consumer to an eastern furnace. The generally accepted market on basic now is $13.50, delivered eastern Pennsylvania. While $13 to $13.50, furnace, still is the going market on plain foundry iron, the usual price appears to be nearer the lower figure.

Action on several thousand tons of gray forge for the Reading Iron Co. is expected shortly. On 197 tons of foundry iron for the Norfolk navy yard, Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., is low with a bid of $16.7544, delivered.

Buffalo—New orders for pig iron are slower, but sales in the past six weeks have exceeded those of any similar period this year. Radiator plants here are operating on full 5-day schedules. They and some other consumers are taking more iron than at any time in recent months.

Youngstown, O.—Valley interests note a gradual pickup in the number of small orders for foundry and malleable grades. Most of the tonnage, however, continues to go as hot metal to district ingot mold foundries. Quotations appear steady.

Cleveland—The improvement in pig iron shipments is well sustained, and the number of foundries taking iron is steadily increasing. Those on railroad and automotive work have shown relatively less expansion recently than the general average.

Sales by producers with headquarters here in the past week totaled 5000 tons, including a good share booked by a steelworks interest in small lots. The base price for local delivery holds at $15, furnace, with $14 the usual price for shipment to competitive districts.

Cincinnati—The pig iron market continues to reflect a better melt in many foundries. Demand for southern iron is restricted, but the price is firm at $10, base, Birmingham.

Chicago—Pig iron activity is holding recent gains and showing aditional improvement in some directions. Shipments continue well ahead of the September rate, and although new business is increasing more slowly than shipments, inquiry remains active and consumers are showing more interest in future requirements. Forward coverage in some instances has been extended as far as the first six months of next year. Prices are steady.

St. Louis—Spot pig iron sales have slowed down. Shipments indicate this month will equal September, the best of the year. Stove and heating apparatus plants and jobbing foundries are taking the major portion of the iron now moving. The latest drop in grain prices is exerting a depressing effect on farm implement business.

Birmingham, Ala.—The Woodward Iron Co. is relining a blast furnace preparatory to operation, but is planning to blow out one or two stacks now active. The market is slow, and shipments are intermittent, varying considerably from week to week.

Toronto, Ont.—Current demand continues light, though there seem to be better prospects for improvement over the remainder of the year. The melt averages 20 to 25 per cent. Prices are firm.

Coke

Foundry Movement Steady in Most Districts—Distress Offerings of Furnace Grades Noted

COKE PRICES, PAGE 52

Pittsburgh—A sale last week at $2.05 for furnace coke substantiates the market of $2. Upward of $2.15 has been done. On the other hand, distress offerings of furnace coke have been made down to $1.75. High sulphur coke is exerting an undermining tendency on the furnace coke market. By-product foundry coke has been advanced 50 cents to $2.40, Weirton, W. Va. Connellsville coke is quiet at $2.75 to $4.25, depending upon grade.

New York — While spot buying shows little change, specifications for metallurgical coke have improved. Heating grades of beehive furnace coke reflected more interest on the part of stove manufacturers and foundries identified with the textile industry. Prices are unchanged.

Cincinnati—Shipments of by-product foundry coke this month show a marked increase over last month. The movement of domestic grades is about up to seasonal expectation.

Chicago—Shipments of by-product foundry coke show a fairly good increase over the September rate, while the movement of heating coke so far in October equals the total tonnage shipped in September. Foundry coke consumption is increasing slowly and requirements still are at a low level. The market continues $7, ovens, for outside delivery.

St. Louis—Foundry coke consumption is maintained at the September rate. Production has not changed and stocks at by-product ovens are about normal for this season. Melters are not taking in stocks for winter requirements.

Birmingham, Ala.—Sales are fairly good and shipments appear to be broadening. Producers anticipate further improvement shortly.

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to withstand shocks like this • • • •

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Dependability in Illinois Alloy Steel is assured through careful control of production plus rigid inspection of every heat.

Illinois Steel Company

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

208 South La Salle Street, Chicago, Illinois

PROPOSED "SHARON SPECIFICATIONS"

RESULT . . . DEPOSIT TROUBLES WERE OVERCOME . . . AND CORRECT FINISH FOR THE STRIP STEEL WAS GAINED

Many fabricators who maintain their own pickling departments have taken advantage of Sharon's wealth of experience and knowledge of various pickling processes in connection with strip steel. ▼ Just recently a manufacturer, finding troublesome deposits on his strip steel after pickling, brought the matter to the attention of a Sharon representative. After spending the necessary time in the customer's pickling department to study the cause, an improvement of the pickling process was recommended . . . and the deposits were eliminated. ▼ In another case, a specially desired finish on strip steel was gained through Sharon's practical engineering aid—the recommendation of a definite change in the pickling solution. ▼ These are day by day examples that illustrate the interest and aid Sharon extends beyond the manufacturing and supplying of correctly specified, highest quality strip steel. ▼ What is your present strip steel problem? Send for a Sharon representative and experience the thoroughness of "Sharon Specifications" service to help you solve it.

SHARON STEEL HOOP CO., SHARON, PA.

SHARON

Hot and Cold Rolled Strip Steels

"Enamelite" Enameling Iron

"Nevastain" Stainless Steels

Steel Sheets

Scrap

Waiting Attitude Prevails with Prices Steady—Melters Buying Little and Holders Not Selling

Chicago—Scrap continues to mark time. Small lots of heavy melting steel have been purchased recently with the market unchanged at $5.75 to $6.00. Mills continue well supplied by stocks on hand and are not interested in buying. Shipments against orders are well maintained at a slow rate. Small consumers are less active and quotations on some grades are partly nominal. Offerings are fairly well balanced with demand, although railroads are selling only small lots.

Boston—Demand for scrap is dull. While prices are generally unchanged, there is an easy tendency in some grades while buying of cast grades has slowed, as has movement to points outside of New England. Dealers are now offering $4.25

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	6.00 to 6.50
Boston, dealers	3.50 to 3.75
Buffalo, No. 1	7.50 to 8.00
Buffalo, No. 2	6.25 to 6.75
Chicago	5.75 to 6.00
Cleve., No. 1	7.50 to 8.00
Cleve., No. 2	6.50 to 7.00
Det., No. 1 deal.	5.75 to 6.25
Det., No. 2 deal.	4.50 to 5.00
E. Pa. del. mill	7.00 to 7.50
E. Pa., No. 2 del.	5.50 to 6.00
N. Y. deal. R. R.	4.50 to 4.75
N. Y. deal, No. 2	3.50
N. Y. deal. yd.	2.50 to 3.00
Pitts. No. 1	9.25 to 9.75
St. L. No. 1 sel.	6.00 to 6.50
Federal, Ill.	5.50 to 6.00
Granite City, Ill.	5.00 to 5.50
Valleys, No. 1	10.00 to 10.50

COMPRESSED SHEETS

Buffalo, dealers	6.25 to 6.75
Chi. (Factory)	4.25 to 4.75
Cleveland	7.00 to 7.50
Detroit, dealers	5.50 to 6.00
E. Pa. new mat.	5.00 to 5.50
Pittsburgh	9.00 to 9.50
Valleys	9.00 to 9.50

BUNDLED SHEETS

Buffalo	4.25 to 4.75
Cinci., del.	4.25 to 4.75
Cleveland	5.00 to 5.50
Eastern, Pa.	5.00
Pittsburgh	8.00 to 8.50
St. Louis	1.50 to 2.00

SHEET CLIPPINGS LOOSE

Chicago	2.00 to 2.50
Cincinnati	2.00 to 2.50
Detroit, dealers	2.00 to 2.50
St. Louis	1.50 to 2.00

STEEL RAILS SHORT

Birmingham	7.50 to 8.50
Boston, dealers	4.00 to 4.50
Buffalo	9.50 to 10.00
Chicago (3 ft.)	8.00 to 8.50
Chicago (2 ft.)	8.50 to 9.00
Cinci., del.	9.00 to 9.50
Detroit, deal.	8.00 to 8.50
Pitts. (open-hearth, 3 ft. and less)	10.50 to 11.00
St. Louis	7.50 to 8.00

STOVE PLATE

Birmingham	5.50 to 6.00
Boston, dealers	2.50 to 3.00
Buffalo	7.75 to 8.00
Chicago, net	5.75 to 6.25
Cinci., deal. net	3.50 to 4.00
Det., net deal.	3.00 to 3.50
Eastern Pa.	6.50
N. Y., deal. mill	2.50 to 3.00
St. Louis	5.50 to 6.00

COUPLERS, SPRINGS

Buffalo	9.00 to 9.50
Chicago	6.50 to 7.00
Eastern Pa.	9.00 to 9.50
Pittsburgh	9.50 to 10.00
St. Louis	6.00 to 6.50

ANGLE BARS—STEEL

Chicago	7.00 to 7.50
St. Louis	6.00 to 6.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	9.00 to 9.50
Cleveland bil. and bloom crops	10.00 to 11.00
Eastern Pa.	9.00 to 9.50
Pittsburgh billet bloom crops	10.50 to 11.00
Pitts., sheet bar crops	11.00 to 12.00

FROGS, SWITCHES

Chicago	6.00 to 6.50
St. Louis	6.00 to 6.50

SHOVELING STEEL

Chicago	5.75 to 6.00
Cleveland	6.25 to 6.50
St. Louis	5.00 to 5.50

RAILROAD WROUGHT

Birmingham	5.00 to 5.50
Boston, dealers	1.00 to 1.50
Buffalo, No. 1	4.50 to 5.00
Buffalo, No. 2	7.00 to 7.50
Cinci., No. 2	5.75 to 6.25
Chi., No. 1, net	5.00 to 5.50
Chicago, No. 2	5.75 to 6.00
Eastern Pa.	7.00 to 7.50
N. Y., No. 1, deal.	2.50 to 3.00
Pitts., No. 2	9.25 to 9.75
St. Louis, No. 1	3.50 to 4.00
St. Louis, No. 2	5.00 to 5.50

SPECIFICATION PIPE

Boston	3.00 to 4.00
Eastern Pa.	7.00 to 7.50
N. Y., deal	2.00 to 2.25

BUSHELING

Buffalo, No. 1	6.25 to 6.75
Chicago, No. 1	4.00 to 4.50
Cinn., No. 1 dl.	4.00 to 4.50
Cinn., No. 2	2.50 to 3.00
Cleve., No. 2	3.00 to 3.50
Det., No. 1 new deal	4.75 to 5.25
St. L., No. 1	3.00 to 3.50
Val. new No. 1	8.50 to 9.00

MACHINE TURNINGS

Birmingham	3.00 to 3.50
Boston, dealers	0.75 to 1.00
Buffalo	3.75 to 4.25
Chicago	3.00 to 3.50
Cin., deal.	3.00 to 3.50
Cleveland	4.50 to 5.00
Detroit	3.00 to 3.50
Eastern Pa.	3.50 to 4.00
N. Y., deal	1.35 to 1.50
Pittsburgh	5.75 to 6.25
St. Louis	1.50 to 2.00
Valleys	7.00 to 7.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	.75 to .90
Buffalo	3.75 to 4.25
Cinn., deal.	3.00 to 3.50
Cleveland	4.50 to 5.00
Detroit, deal.	3.25 to 3.75
Eastern Pa.	3.00 to 3.50
N. Y., deal	1.35 to 1.50
Pittsburgh	6.25 to 6.75

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	3.00 to 3.50
Boston, chem.	5.50 to 6.00
Boston, dealers	1.00 to 1.25
Buffalo	4.25 to 4.50
Chicago	4.00 to 4.50
Cinn., deal.	3.00 to 3.50
Cleveland	4.50 to 5.00
Detroit, deal.	3.25 to 3.75
Eastern Pa.	3.00 to 3.50
E. Pa., chem.	8.00 to 10.50
N. Y., deal.	1.00 to 1.50
Pittsburgh	6.25 to 6.75
St. Louis	2.75 to 3.25

PIPE AND FLUES

Cinn., deal.	3.25 to 3.50

RAILROAD GRATE BARS

Buffalo	4.00 to 4.50
Chicago, net	5.00 to 5.50
Cincinnati	4.00 to 4.50
Eastern Pa.	5.50 to 6.00
N. Y., deal.	3.50 to 4.00
St. Louis	4.50 to 5.00

FORGE FLASHINGS

Boston, dealers	2.00 to 2.50
Buffalo	5.50 to 6.00
Cleve. ov. 10 in.	6.50 to 7.00
Detroit	4.00 to 4.50

FORGE SCRAP

Boston, dealers	1.75 to 2.00
Chicago	7.00 to 7.50
Eastern Pa., del.	5.00 to 5.50

ARCH BARS, TRANSOMS

Chicago, net	5.00 to 5.50
St. Louis	5.00 to 5.50

AXLE TURNINGS

Boston, deal.	6.00 to 6.50
Buffalo	6.50 to 7.00
Chi., elec. fce.	4.50 to 5.00
Cleveland	5.50 to 6.00
Eastern Pa., del.	7.00
Pittsburgh, O. H.	7.75 to 8.25
St. Louis	3.50 to 4.00

STEEL CAR AXLES

Birmingham	9.00 to 9.50
Boston, ship. pt.	6.00 to 6.50
Buffalo	10.00 to 10.50
Chicago, net	8.50 to 9.00
Eastern Pa.	14.50
St. Louis	9.00 to 9.50

SHAFTING

Boston, ship. pt.	6.50 to 7.00
N. Y., deal.	6.50 to 7.00
St. Louis	7.50 to 8.00
E. Penna.	11.00 to 12.00

CAR WHEELS

Birming., iron	6.50 to 7.50
Boston, iron deal.	3.50 to 4.00
Buffalo, iron	7.00 to 8.00
Buffalo, steel	8.50 to 9.00
Chicago, iron	7.00 to 7.50
Chi., rolled steel	6.50 to 7.00
Cincinnati iron	6.25 to 6.75
E. Pa. steel	9.00 to 10.00
E. Pa. iron	9.00 to 9.50
Pitts., iron	8.50 to 9.00
Pitts., steel	9.50 to 10.00
St. Louis, iron	5.00 to 5.50
St. Louis, steel	7.00 to 7.50

NO. 1 CAST SCRAP

Birmingham	6.50 to 7.00
Buffalo (Mach.)	10.00 to 10.25
Buffalo, cupola	9.00 to 9.50
Boston, textile	7.00 to 7.50
Boston No. 2	3.00 to 3.50
Chi., mach. net	6.50 to 7.00
Chi., railroad, net	6.00 to 6.50
Chicago, agri., net	5.25 to 5.75
Cinn., mach. cup.	7.00 to 7.50
Cleve. cupola	7.00 to 8.00
Det., net deal.	6.50 to 7.00
E. Pa. cupola	9.00 to 9.50
N. Y., cup. deal.	5.50 to 6.50
N. Y., del. local foundries	8.00 to 8.50
Pitts., cupola	9.50 to 10.00
San Fran., del.	13.50 to 14.00
Seattle	4.50 to 6.50
St. L. No. 1 ma.	6.50 to 7.00
St. L., No. 1	6.00 to 6.50

HEAVY CAST

Boston, del.	4.00 to 4.25
Bost., mach. cast	7.00 to 7.50
Buffalo, break	6.50 to 7.00
Cleve., break	4.50 to 5.00
Detroit, auto, net deal.	7.00 to 7.50
Det., break., dl.	5.00 to 5.50
Eastern Pa.	8.50 to 9.00
N. Y. No. 1, dl.	5.00 to 5.50
N. Y. break, dl.	4.75 to 5.25
Pittsburgh	8.25 to 8.75

MALLEABLE

Boston Consum.	7.50 to 8.00
Buffalo	8.00 to 8.50
Chicago, agri.	5.00 to 5.50
Chicago, R. R.	6.50 to 7.00
Cinci., R. R., del.	7.50 to 8.00
Cinci., agri. del.	7.00 to 7.50
Cleveland, rail	7.50 to 8.00
Det. auto deal.	5.00 to 5.50
St. Louis, rail	4.50 to 5.00

RAILS FOR ROLLING

5 feet and over

Birmingham	7.50 to 7.75
Boston, deal.	5.00 to 5.50
Buffalo	7.00 to 7.50
Chicago	8.25 to 8.75
Eastern Pa.	9.50
New York dealer	4.25 to 4.75
St. Louis	7.25 to 7.75

LOCOMOTIVE TIRES

Chicago, cut	7.00 to 7.50
St. L., No. 1	5.00 to 5.50

LOW PHOS. PUNCHINGS

Chicago	7.50 to 8.00
Buffalo	9.00 to 9.50
Eastern Pa.	9.50 to 10.00
Pittsburgh	10.50 to 11.00

for heavy breakable. No. 1 steel continues $5, delivered Worcester.

New York—While No. 1 steel for barge loading has declined 50 cents, dealers now paying $4.50, scrap prices for the most part are unchanged, although there is an easier tendency. For rail shipment of No. 1 at northern New Jersey points the dealers' price is off 25 cents to $4.50. Stove plate is being bought at $4.50, barge, for shipment to the Buffalo district. One eastern plate mill has held up shipments, but another is taking scrap mostly No. 1, steadily. Two holidays slowed up the market last week.

Philadelphia—Scattered buying of scrap includes about 500 tons of No. 1 and No. 2 heavy melting steel for the Sparrows Point plant of the Bethlehem Steel Co. This tonnage was placed on the basis of $6.50, delivered, for No. 1; however, this price does not affect the spread of the local market, which continues $7 to $7.50, delivered eastern Pennsylvania mills. All prices are unchanged.

Buffalo — Tonnage inquiry for heavy melting steel is lacking. Some consumers say they will not purchase this year but dealers think stocks are finally at or near a point which may compel some buying this quarter. Canal shipments of scrap to Buffalo melters are understood to be ended for this season. Cast, malleable and short steel rails show increased firmness, based on recent sales at prices at the peak of quoted ranges.

Pittsburgh—No important mill purchasing developed last week as was anticipated two weeks ago. Probally half of the 30,000-ton Pennsylvania list was not awarded and only a small quantity of 9000 tons of No. 1 heavy melting steel was sold. This tonage is understood to have moved to a down-river steel mill at close to $100 per gross ton. Low phosphorus material is dull and the same may be said of other specialties. No. 1 heavy melting steel continues at $9.25 to $9.75, with blast furnace material around $6.50. Bids have been withdrawn on the 4000 tons of cast iron and steel scrap in the Brilliant pumping station, Pittsburgh.

Cleveland—Some releases of blast furnace material involving several hundred tons by one steelmaker have brought a little relief to the dull iron and steel scrap situation. More heavy material is expected to be released in the next fortnight. Valley dealers find it difficult to persuade steelworks to accept shipments of heavy steel already purchased.

Detroit—Iron and steel scrap prices continue unchanged, holding recent gains which put No. 1 heavy melting steel at $5.75 to $6.25 and compressed sheets at $5.50 to $6. Dealers continue confident of a further rise. Production of scrap in this district is increasing slightly.

Cincinnati—Quotations on iron and steel scrap are being maintained unchanged, with a steady demand. The recent strong tone of the market is somewhat modified. One mill is holding up shipments but announced this is only temporary. Most new business is in small lots.

St. Louis—There is some purchasing of iron and steel scrap, mainly of steel grades, but the total is not impressive and both buyers and sellers are waiting developments. The tone of the market is firm. Offerings are light, and dealers find it hard to buy to fill contracts.

Birmingham, Ala.—Prices are unchanged and demand continues light. Dealers are buying against immediate prospects only, with no shortage in sight.

Toronto, Ont.—General conditions in the scrap market are unchanged. Special lines are moving, while steel grades are dull. Dealers continue to offer $11 to $12 for No. 1 machinery cast, with little available.

Ferroalloys More Active

Ferroalloy Prices, Page 52

Demand for ferromanganese and domestic spiegeleisen, 19 to 21 per cent, appears to be slightly better, in line with the gradual upturn in steelmaking operations. Prices are steady at $68, duty paid, for ferromanganese, and $25, furnace, for spiegeleisen. Some trading in Canadian spiegeleisen is noted in the Middle West.

Equipment

Sales Off Slightly as Buyers Hesitate Closing

New York—Machine tool industry includes few members operating better than 25 per cent and the industry as a whole is averaging hardly better than 20 to 25 per cent. Exceptions to this rate are few. Inquiry and buying continues light and the more conservative builders look for a continuance of present conditions until early 1933. The matter of possible price reductions on standard tools has been brought up with most members of the industry taking the view that reductions would in no way stimulate volume. Considerable government machine equipment is being bought and listed for bids, mostly in the West, but bidding on this type of business reveals some sharp variations in prices with one or two competitors generally far below others.

Worcester, Mass.—While there has been no general improvement in demand for machinery, in spots there have been some slight gains, notably with textile mill equipment builders and a slightly better call for repair parts, not only with textile machinery producers, but also from general industry. Grinding machinery makers find a better inquiry is coming in, some of which indicates promising business in the near future. A number of new tools have appeared in grinding machine lines.

Pittsburgh—Several active equipment inquiries of a few weeks ago have quieted and the market appears as dull as it was in mid-summer. Repair work still is being figured and occasionally a small order is placed. Machinery for a Sharon, Pa., interest will probably be closed upon this week, although there is no promise of an early disposal for the American Sheet & Tin Plate Co.'s mills for Vandergrift, Pa., and Gary, Ind. Early disposal by the Youngstown Sheet & Tube Co., for orders for conduit finishing machinery, is expected.

Cleveland—Sales of machinery and equipment in October will be somewhat less than in September, contrary to previous forecasts. A considerable number of small inquiries are in the active stage. It is understood that final decision on the list of machines which a truck builder here has up for inquiry is being held in abeyance until the latter part of this month.

Chicago—Activity in machine tools and plant equipment was quieter during the past week. Business still is spotty and although some products are moving better than during summer months there is a lack of concerted effort toward extensive improvement of plant facilities. Sellers believe the large amount of idle equipment occasioned by low operations will continue to have a depressing effect upon new purchases but pin some hope on the development of better demand from railroads who almost generally have been out of the market for more than a year. No new tool purchases by the corporation which will commence production of electric refrigerators shortly are reported. Demand from farm implement manufacturers is light.

makes good steel better

Today you must sell at lower costs, but satisfy the customer as well.

The real test of a sheet is the quality of the finished product it turns out. It must stand up under its job—withstand unusual and unforeseen strains, stresses and overloads. The sheet must have a smooth, uniform surface—finer structure—added toughness.

Ferro-Carbon Titanium reduces costs and yields a higher quality product. Titanium treatment is playing an important part in cost reduction and product improvement for many classes of steels. Titanium Engineers will gladly counsel with you.

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Balfour, Guthrie & Co., San Francisco, Los Angeles, Portland, Seattle, Tacoma, Vancouver, B. C.

GREAT BRITAIN AND EUROPE
T. Rowlands & Co., Ltd., Sheffield, Eng.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 6.25c, Conn., for copper

SHEETS	
Yellow brass (high)	12.50
Copper, hot rolled	15.37½
Lead sheets, cut, to jobbers	7.00
Zinc sheets (100-lb. base)	9.00
TUBES AND PIPES	
Seamless yellow brass (high)	15.25
Seamless copper	14.37½
RODS	
Yellow brass (high, full turning)	10.25
Naval brass	11.37½
ANODES	
Copper, untrimmed	12.25
WIRE	
Yellow brass (high)	12.50

Old Metals

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass	
New York	3.00 to 3.25
Chicago	3.00 to 3.25
Cleveland	3.00 to 3.25
St. Louis	2.50
HEAVY YELLOW BRASS	
New York	2.00 to 2.25
HEAVY COPPER AND WIRE	
New York	3.75 to 4.00
Chicago, No. 1	3.75 to 4.00
Cleveland	3.50 to 3.75
St. Louis	2.75
COMPOSITION BRASS BORINGS	
New York	2.87½ to 3.12½
YELLOW BRASS TUBING	
Cleveland	2.00 to 2.25
LIGHT COPPER	
New York	3.25 to 3.50
Chicago	2.75 to 3.00
Cleveland	3.00 to 3.25
St. Louis	2.50
LIGHT BRASS	
Chicago	1.75 to 2.00
Cleveland	1.50 to 1.75
St. Louis	1.50
LEAD	
New York	2.00 to 2.25
St. Louis	2.25
ZINC	
New York	1.12½ to 1.37½
Cleveland	1.00 to 1.25
St. Louis	1.25
ALUMINUM	
Clippings, new, soft, Cleve.	9.00 to 10.00
Clippings, hard, Cleveland	7.50 to 8.50
Borings, Cleveland	3.00 to 3.50
Mixed cast, Cleveland	4.00 to 4.50
Mixed cast, St. Louis	3.00 to 3.25

Secondary Metals

Remelt aluminum No. 12	7.50 to 8.50
Brass ingot, 85-5-5-5	6.25

Metals

Little Incentive Offered to Consumers to Make Purchases—Copper Holds—Zinc, Lead Off

New York—Continued quietness in the general business situation and uncertainty over the national elections next month give metal consumers little incentive to place commitments. Copper, aluminum, nickel and antimony held unchanged. Straits tin rose slightly, while zinc and lead declined somewhat.

Copper—First hand sellers maintained the recently prevailing quotations of 6.25c, Connecticut, 6.12½c, refinery, and 6.37½c, Middle West, on electrolytic metal for delivery through the first quarter of 1933. Rumors to the effect that some interests would take business at shaded prices were unsubstantiated. Resale metal came into the market during the week at prices ranging from 5.75c to 6.00c, Connecticut. The majority of consumers appeared to be well covered on requirements. Demand for copper and brass rolled products has been somewhat less active this month. Brass ingot also has been moving slowly.

Lead—Restricted demand induced one seller to cut its price early in the week to the basis of 3.00c, New York. The East St. Louis price settled to 2.90c. All sellers, however, were not willing to sell metal at these levels. One midwestern interest refused to take business except at an average price and from customers only. Late in the week some business was done above quoted levels.

Zinc—Demand for zinc was quiet with prices somewhat easier. A little routine business was done during the week at 3.05c, East St. Louis, although some metal also was reported available at 3.00c. The rather weak position in the zinc market has continued despite improvement in the statistical position of the industry through low production, heavier shipments and resultant smaller stocks on hand.

Tin—The level of prices was somewhat higher last week but consumer buying was in light volume. Prices were largely nominal on some days and reflected fluctuations in London. Supplies of tin show considerable reduction over a year ago but still are excessive.

Aluminum—Prices retained recent steadiness but demand was in fair volume only.

Antimony — Metal for spot and nearby delivery held at 5.62½c, duty paid. Buying was light.

Distillate Inquiries Improve; Prices Steady

New York—Inquiry for distillates is slightly heavier and broader, although actual buying has gained little. Prices are steady. Contracting for naphthalene at recently announced prices has failed to develop,

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.20
90 per cent benzol	0.20
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per Pound at Producers' Plants in 250-Pound Drums

Phenol	0.153 to 0.173

Per Pound at Producers' Plants

Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75

Per 100 Pounds Atlantic Seaboard

Sulphate of ammonia	$1.05

and there is little spot buying. Sulphate of ammonia activity is light, with the October price of $1.05 per 100 pounds, seaboard, holding.

Quicksilver Firm

New York—Quicksilver continues unchanged with round lots available at $47, a virgin flask of 76 pounds, and small lots quoted at $48 a flask.

Nonferrous Metal Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
Oct. 8	6.25	6.37½	6.00	23.95	24.25	3.15	3.00	3.05	22.90	5.62½	35.00
Oct. 10	6.25	6.37½	6.00	23.85	24.15	3.00	2.90	3.05	22.90	5.62½	35.00
Oct. 11	6.25	6.37½	6.00	24.10	24.40	3.00	2.90	3.05	22.90	5.62½	35.00
Oct. 12—Holiday											
Oct. 13	6.25	6.37½	6.00	24.25	24.55	3.02½	2.90	3.02½	22.90	5.62½	35.00
Oct. 14	6.25	6.37½	6.00	24.20	24.45	3.02½	2.90	3.02½	22.90	5.62½	35.00

Pacific Coast

Financing of Golden Gate Bridge Will Release 200,000 Tons Steel — Reconstruction Finance Corp. Aid Gives More Hopeful Feeling in Northwest— Many Small Lots Are Let

San Francisco—(*By Air Mail*)—Of primary interest this week was the decision of the Reconstruction Finance Corp. to take over $62,000,000 worth of bonds for the $75,000,000 San Francisco-Oakland bay bridge, involving close to 200,000 tons of steel, of which 170,000 tons will be structural shapes and cable and 20,000 tons reinforcing steel. Bids for this work will be issued within the next few days.

Awards were not particularly heavy, but sentiment continues to improve. New inquiries include over 1000 tons of structurals for car frames for the Pacific Fruit Express Co., San Francisco.

Awards of reinforcing bars aggregated less than 500 tons. Truscon Steel Co. booked 100 tons for a swimming pool at Claremont, Calif., and the Soule Steel Co. 100 tons for a bridge in Los Angeles. Pacific Coast Steel Corp. took 1200 tons for the El Capitan dam, Pasadena, Calif., and 648 tons for highway work in Los Angeles County, Calif., previously reported as having gone to unnamed interests.

Only two awards were noted this week. West Coast Pipe & Steel Co. took 100 tons of plates for a pipe line at Terra Bella, Calif., and Thurston Co., Richmond, Va., secured 200 tons for tanks at Coco Solo, Canal Zone.

Unnamed interests took 190 tons of sheet steel piling for a weir at Colusa, Calif. Pacific Fruit Express Co., San Francisco, has opened bids on 700 to 1400 tons for underframes.

Warehouse prices in the San Francisco district have been changed. For some time quantity differentials have prevailed, and while the new l.c.l. quotations now show a lower price than formerly, the average is higher. In San Francisco, plates, bars and shapes are now quoted at 3.15c. Blue annealed, No. 10 gage, holds at 3.50c. Hot-rolled annealed sheets, No. 24 gage are quoted at 3.90c, while No. 24 gage galvanized sheets are 4.55c. Bands are now 3.15c. The new quotations on cold finished, in rounds, is 5.55c, with the usual reduction for mill quantities.

R. F. C. Credit Is Aid

Seattle—As the flow of R. F. C. funds increases in the Pacific Northwest beneficial effects are beginning to show. Consequently the business sentiment continues to rise.

The week's awards were of small proportions. Poole & McGonigle, Portland, Oreg., are reported to have booked 157 tons of shapes for a bureau of roads bridge in Yakima county. Local interest is centered on bids Oct. 18 for the state bridge at Wallapa river, Washington, calling for more than 500 tons of structurals. Fabricating plants are running short of work, even small jobs.

The navy department is in the market for a $65,000 crane for Puget Sound navy yard. This week Portland opened bids for a portable air compressor. Spokane has opened tenders for about 150 tons of 6, 8 and 10-inch cast iron pipe and will receive bids Oct. 20 for furnishing galvanized water pipe, fittings and bronze curb cocks.

Steel in Europe

Export Inquiry and Sales Are Growing Better

London—(*By Radio*)—Business in iron and steel continues slow in most sections. Exports of pig iron are small. Demand for strip is improving and galvanized sheet prospects are better. Steel and plant contracts for the Soviets have been placed with British firms. Australia has bought some steel tubes. Inquiries for steel for export are expanding slightly.

Production of pig iron in September was estimated at 260,000 tons, practically the same as the 259,400 tons produced in August. Steel imports changed little, with 107,108 tons in September and 105,072 in August. Steel exports dropped from 156,191 tons in August to 127,039 in September.

Reports of increased export activities come from the Continent; northern French firms have booked some structural orders, Germany has taken orders for galvanized sheets and structurals and Belgium some structural tonnage for the Near East.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 13

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

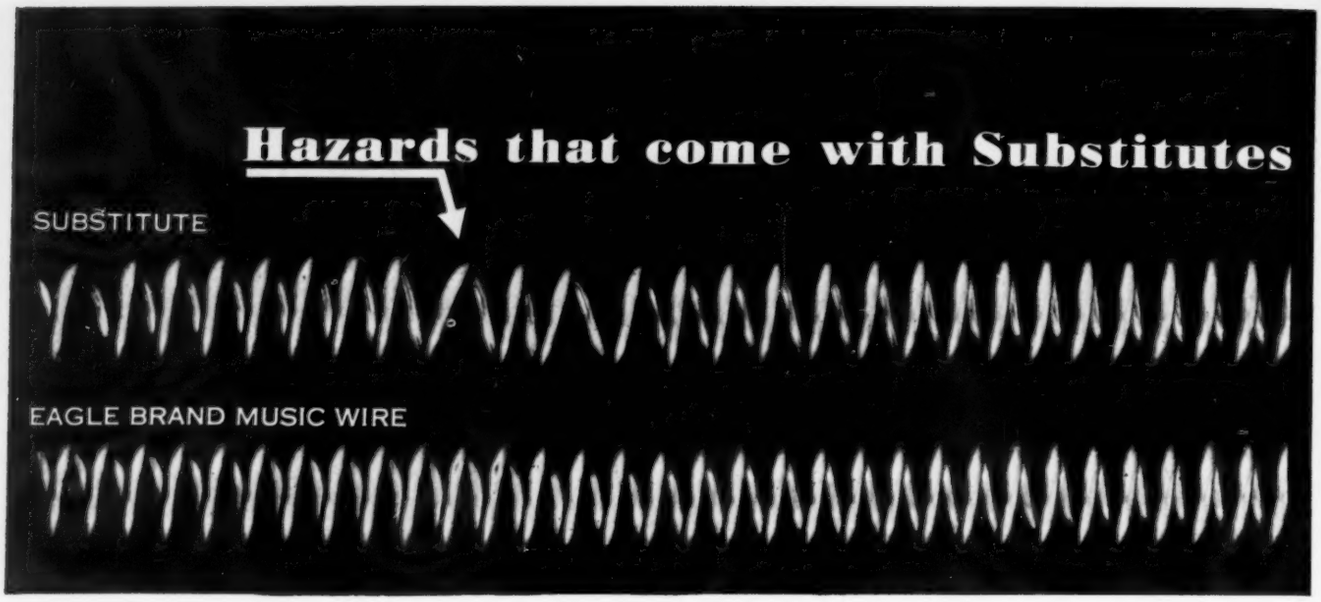
	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON		£ s d		£ s d L s d
Foundry, 2.50-3.00 Silicon	$10.06	2 18 6	$ 8.76 to $9.25	1 16 0 to 1 18 0
Basic bessemer	9.29	2 14 0*	6.81	1 8 0
Hematite, Phos. .03-.05	10.32	3 0 0	.....	.....
SEMIFINISHED STEEL				
Billets	$16.77	4 17 6	$9.49	1 19 0
Wire rods, No. 5 gage	25.80	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$26.74	7 15 0	$26.77	5 10 0
Merchant bars	.94c	6 2 6	.54c	2 9 0
Structural shapes	1.14c	7 7 6	.46c	2 2 0
Plates, †¼ in. or 5 mm.	1.35c	8 15 0	.66c	3 0 0
Sheets, black, 24 gage or 0.5 mm.	1.23c	8 0 0	1.21c to 1.24c	5 10 0 to 5 12 6
Sheets, gal., 24 gage, corr.	1.54c	10 0 0	1.49c	6 15 0
Bands and strips	1.19c	7 15 0	.66c to .69c	3 0 0 to 3 2 6
Plain wire, base	1.46c	9 10 0	1.18c	5 7 6
Galvanized wire, base	1.77c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.69c	11 0 0	1.21c	5 10 0
Tin plate, box 108 lbs.	$ 2.75	0 16 0	$3.20	0 13 2

British ferromanganese $68 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$10.06	2 18 6	$ 8.04	205(2)	$ 8.48	305	$16.42	69
Basic bessemer pig iron	9.29	2 14 0*	6.86	175(1)	7.51	270	17.96	75.50
Furnace coke	2.06	0 12 0	4.86	124	3.06	110	4.57	19.20
Billets	17.20	5 0 0	14.50	370	10.43	375	22.96	96.50
Standard rails	1.27c	8 5 0	1.25c	697	1.50c	1,150	1.37c	127
Merchant bars	1.02c	6 12 6	.95c	530	.60c	460	1.19c	110
Structural shapes	1.35c	8 15 0	.99c	550	.57c	435	1.16c	107.50
Plates, †¼-in. or 5 mm.	1.39c	9 0 0	1.17c	650	.71c	545	1.37c	127
Sheets, black	1.27c	8 5 0§	1.44c	800‡	.85c	650‡	1.56c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	1.46c	9 10 0	2.83c	1,570	1.64c	1,260	4.00c	370
Plain wire	1.46c	9 10 0	2.03c	1,130	1.95c	1,500	1.92c	178
Bands and strips	1.46c	9 10 0	1.04c	580	.81c	625	1.37c	127

*Basic. †British ship-plates, Continental, bridge plates. §24 ga. ‡1 to 3 mm. basis price.
British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel.



SINCE 1855, Music Wire has been recognized internationally as the finest grade of wire produced in the world. In these days of extreme economies an inferior wire is being offered as a SUBSTITUTE. Is a symbol of quality that has existed for seventy-seven years to be destroyed?

Naturally, there are many hazards that come with using these substitute music wires. Among these are:

The added cost of inspection, waste of wire, trouble in automatic spring-making machines, and other difficulties due to lack of uniformity, quality, and cast.

Genuine Music Wire is made from selected Swedish Steel. Great care is taken in rolling the steel into rods to avoid seams or laps. Long experience and precision in the heat treating operations contribute to the quality of Genuine Music Wire. And, above all, the gradual reduction given at each draft holds the accuracy of size, uniformity, and given tensile strength.

As an executive, you will see how easy it would be to substitute inferior stock and take short cuts to produce a White Liquor finish that resembles or imitates Genuine Music Wire in finish alone.

To guard against the hazards that come with using substitutes, it is advisable to specify "Eagle" Brand Music Wire. It is to your advantage to do so because, in the long run, you pay for genuine quality whether you buy it or not.

●

WASHBURN WIRE CO., PHILLIPSDALE, R. I.
WASHBURN WIRE CO., INC., NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

STEEL, WROUGHT AND CAST IRON PIPE, AND TUBING

Welded Iron, Steel Pipe □

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to consumers in carloads, Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Steel Blk.	Steel Gal.	In.	Iron Blk.	Iron Gal
¼ & ⅜	57	34	½	28	10½
½	62	49½	¾	33	16½
¾	65½	55	1—1¼	36	20½
1—3	67½	57	2	38	21

LAP WELD

2	61	50½	2	26	12½
2½ to 6	64½	54	2½—3½	33	18½
8	62	51	4—6	35	22
10	60	49	7—8	34	21½
12	59	48	9—12	31	16½

BUTT WELD

Extra strong, plain ends

⅛	48	33	¼ & ⅜	+7	+41
¼ & ⅜	53½	38½	½	28	12½
½	59	49½	¾	33	17½
¾	63½	54	1—2	39	23

LAP WELD

Extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½—4	39	25
5 & 6	62	52½	4½—6	38	24
8	58	47	7 & 8	36	22
10	51½	40½	9—12	26	13½
12	50½	39½			

STEEL LINE PIPE

2 to 3 butt	66½	2½ to 6 lap	63½
2 lap	60	8 lap	61
10 lap	59	12 lap	58

Discounts on steel pipe are net and not subject to any point or preferential. On iron pipe, the discounts shown on the cards are net, and are not subject to any further discounts or preferentials.

BOILER TUBES

Carload discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½ 5, 6	46

Subject to two 5 per cent supplementary discounts for carloads. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing □ □

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe □ □

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$32.00 to 33.00
Four-inch, Birmingham .... 36.00 to 37.00
Four-inch, Chicago ..... 43.40 to 44.40
Six to 24-inch, Chicago..... 40.40 to 41.40
Six-inch and over, N. Y... 32.00 to 34.50
Four-inch, New York ..... 34.50 to 36.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings, $5 higher Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS

Baltimore*	2.35c
Boston	3.25c
Buffalo	2.95c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.65c
Los. Ang.	3.30c
New York‡(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.60c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Baltimore	2.35c
Boston	3.25c
Buffalo	3.15c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS

Baltimore	2.35c-3.00c
Boston	3.10c-3.25c
Buffalo	2.95c
Chattanooga	3.00c
Cincinnati	3.00c
Cleveland	2.10-2.25c
Detroit	2.85c
Houston	3.00c
Los. Ang. cl...	2.10c
Los Ang., lcl	2.40c
New York	2.65c-3.10c
Phila.	2.26½c
Pittsburgh	2.60c
San Fran. cl.	2.50c
San Fran. lcl	2.80c
Seattle	3.00c
St Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	2.35c
Boston	3.35c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.30c
New York(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	2.35c
Boston	3.35c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New York(d)	3.30c
Philadelphia	2.45c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	2.80c
Boston	3.50c
Buffalo	3.45c
Chattanooga	3.50c
Chicago	3.20c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.35c
Houston	3.35c
Los Ang.	3.60c
N. Y.	3.00c
Portland	4.00c
Phila.*† (e)	2.90c
Pitts.**	3.00c
San Fran.	3.50c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.20c
Buffalo	3.70c
Chattanooga	3.65c
Chicago	3.55c
Cincinnati	3.75c
Cleveland	3.25c
Detroit	3.50c
Los Ang.	4.20c
New York	3.75c-4.00c
Phila.*†(e)	3.40c
Pitts.**	3.40c
Portland	4.50c
San Fran.	3.90c
Seattle	4.50c
St. Louis	3.80c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	4.75c
Buffalo	4.05c
Chattanooga	3.95c
Chicago	4.10c
Cincinnati	4.25c
Cleveland	3.75c
Detroit	3.75c
Houston	4.25c
Los. Ang.	4.50c
New York	4.00c-4.10c
Phila.*†(e)	3.75c
Pitts.**	3.90c
Portland	5.00c
San. Fran.	4.55c
Seattle	5.00c
St. Louis	4.35c
St. Paul	4.19c
Tulsa	5.10c

†BANDS

Baltimore	2.65c
Boston	3.75c
Buffalo	3.30c
Chattanooga	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	3.65c
Los Ang.	3.80c
New York(d)	3.30c
Philadelphia	2.75c
Pittsburgh	2.95c
Portland	3.85c
San Fran.	3.15c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

†HOOPS

Baltimore	2.65c
Boston	4.90c
Buffalo	3.95c
Chicago	3.50c
Cincinnati	3.75c
Cleveland	3.65c
Det. No. 14 & lighter	3.30c
New York	3.30c
Philadelphia	3.00c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	3.75c

†New extras apply.

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)*	3.48c
Boston	3.60c
Buffalo	3.00c
Chattanooga*	3.68c
Chicago	3.00c
Cincinnati	3.32c
Cleveland	2.95c
Detroit	3.15c
Los Ang. (a)	4.25c
New York	3.39c
Philadelphia*	3.35c
Pittsburgh	2.95c
Portland (a)	4.50c
San Fran. (d)(f)	5.55c
Seattle (a)	4.50c
St. Paul (a)	3.20c
St. Louis	3.36c
Tulsa	4.65c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(a) Rounds, hex. only.
(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
‡Domestic bars.
*Plus quan. extras.
**Less than 25 sheets.
*†50 or more bundles.

New Iron and Steel Tariff of Canada

(*Concluded from Page* 12)

383—Sheets, plates, hoop, band or strip, of iron or steel—

(a) Coated with tin, of a class or kind not made in Canada, n.o.p.—

New—	Free	15%	15%
Old—	Free	5%	5%

(b) Coated with tin, n.o.p.—

New—	Free	20%	20%
Old—	7½%	12½%	15%

(c) Coated with zinc, n.o.p.—

New—	7½%	20%	20%
Old—	7½%	12½%	15%

385—Sheets, plates, hoop, band or strip, of iron or steel, hot rolled, valued at not less than five cents per pound, n.o.p.—

New	5%	12½%	15%
Old—	5%	12½%	15%

(a) Sheets, plates, hoop, band, or strip, of rust, acid or heat resisting steels, hot rolled valued at not less than 5 cents per pound—

New—	Free	20%	20%
Old—	5%	12½%	15%

386—Sheets, plates, hoop, band or strip, of iron or steel, as hereunder defined, under regulations prescribed by the minister:—

(a) Plates, when imported by manufacturers for use exclusively in the manufacture or repair of the pressure parts of boiler, pulp digesters, steam.

386—Accumulators and vessels for refining of oil, in their own factories, per ton—

New—	Free	$5.00	$5.00
Old—	Free	Free	Free

(m) (i) Sheets of iron or steel, cold rolled, when imported by manufacturers for use exclusively in the manufacture of sheets coated with tin—

New—	Free	15%	15%
Old—	5%	7½%	10%

(ii) Sheets, hoop, band or strip of iron or steel, hot rolled, when imported by manufacturers for use exclusively in the manufacture of sheets, hoop, band or strip, coated with zinc or other metal or metals, not including tin, in their own factories—

New—	5%	20%	20%
Old—	5%	7½%	10%

386 (p)—Sheets of iron or steel, hot or cold rolled, with silicon content of .075% or more, when imported by manufacturers of electrical apparatus, for use in the manufacture of electrical apparatus in their own factories—

New—	Free	12½%	12½%
Old—	7½%	12½%	12½%

386 (q) Hoop steel, hot or cold rolled, plain or coated, 0.064 inch or less, in thickness, not more than three inches in width, when imported by manufacturers of barrels or kegs or by manufacturers of flat hoops for barrels and kegs, for use exclusively in their own factories—

New—	Free	12½%	12½%
Old—	7½%	12½%	12½%

387—Railway rails, of iron or steel, of any weight or for any purpose, punched, drilled or not, n.o.p., per ton—

New—	$4.50	$6.00	$7.00
Old—	$4.50	$6.00	$7.00

387c—Steel grooved (or girder) rails for electric tramway use, weighing not less than 75 pounds per lineal yard, punched, drilled, or not, of shapes and lengths not made in Canada, per ton—

New—	Free	$7.00	$7.00
Old—	$4.50	$6.00	$7.00

388—Iron or steel angles, beams, channels, columns, girders, joints piling, tees, zees, and other shapes or sections, not punched, drilled or further manufactured than hot rolled, weighing not less than 35 pounds per lineal yard, n.o.p., per ton—

New—	Free	$3.00	$3.00
Old—	$1.00	$3.75	$3.00

388b—Iron or steel angles, beams channels, columns, girders, joints, piling, tees, zees and other shapes or sections, not punched, drilled or further manufactured than hot rolled, n.o.p., per ton—

New—	$4.00	$7.00	$7.00
Old—	$4.25	$7.00	$7.00

388e—Iron or steel side or center sill sections, of all sizes not manufactured in Canada, weighing not less than 35 pounds per lineal yard, not punched, drilled or further manufactured, when imported by manufacturers of railway cars, for use in their own factories, per ton—

New—	Free	$3.00	$3.00
Old—	$1.00	$2.75	$3.00

392a—Forgings of iron or steel, in any degree of manufacture, hollow, not less than 12 inches in internal diameter—

New—	Free	30%	30%
Old—	20%	27½%	30%

427c—Machinery, viz.: Power churns, power milk coolers, power fillers and cappers, power ice-cream mixers, power butter printers, power cream savers, power bottle sterilizers, power brine tanks, power milk bottle washers, power milk can washers; ice-breaking machines, valveless or centrifugal milk pumps, sanitary milk and cream vats; none of the foregoing machinery to include motive power—

New—	Free	27½%	35%
Old—	15%	27½%	35%

428b—Engines for motor trucks or motor buses, when of 100 h.p. or more—

New—	Free	25%	27½%
Old—	11%	25%	27½%

429—Cutlery of iron or steel, plated or not:

(b) Table knives and table forks—

New—	15%	30%	35%
Old—	20%	27½%	30%

(c) Pen knives, jack-knives and pocket knives of all kinds—

New—	Free	30%	30%
Old—	20%	27½%	30%

(d) Knives, n.o.p.—

New—	Free	30%	30%
Old—	20%	27½%	30%

(e) Spoons—

New—	15%	30%	35%
Old—	20%	27½%	30%

(f) Scissors and shears, n.o.p.—

New—	Free	30%	20%
Old—	20%	27½%	30%

(g) Razors and razor blades—

New—	Free	30%	30%
Old—	20%	27½%	30%

431b—Adzes, anvils, vises, cleavers, hatchets, saws, augers, bits, drills, files, rasps, screw drivers, planes, spokeshaves, chisels, mallets, metal wedges, wrenches, sledges, hammers, crowbars, cantdogs, and track tools, picks, mattocks and eyes or polls for the same—

New—	10%	35%	35%
Old—	15%	27½%	30%

422a—Concrete road-paving machines, self propelling, end loading type, with a capacity of 21 cubic feet of wet concrete or more; concrete and asphalt road finishing machines; form graders; sub-graders; back filling machines and equipment, mounted on self-propelling wheels or crawling traction, semi or full-revolving boom and scraper type; steam or air driven pile hammers or extractors; well-points; truck turntables; all the foregoing of a class or kind not made in Canada and complete parts thereof—

New—	Free	10%	12½%
Old—	Free	10%	12½%

422b—Trench and ditch excavating machines, round wheel or vertical or ladder boom, chain and bucket type, for digging vertical or sloping bank ditches—

New—	Free	10%	15%
Old—	Free	10%	12½%

427b—Ball and roller bearings—

New—	5%	27½%	35%
Old—	15%	27½%	35%

406—Coil chain, coil chain links, including repair links, and chain shackles, of iron or steel:

(b) Less than one and one-eighth inches in diameter—

New—	15%	25%	25%
Old—	15%	20%	20%

407a—Chains, or iron or steel, n.o.p.—

New—	20%	30%	35%
Old—	20%	27½%	30%

408—Malleable sprocket chain and link belting chain, of iron or steel, including roller chain of all kinds for operating on steel sprockets or gears, when imported by manufacturers of agricultural implements, for use exclusively in the manufacture of agricultural implements, in their own factories, under regulations prescribed by the Minister—

New—	Free	10%	10%
Old—	Free	Free	Free

409—Cream separators and complete parts, thereof, including steel bowls—

New—	Free	25%	25%
Old—	Free	Free	Free

401L—Ore crushers, rock crushers, stamp mills, grinding mills, rock drills, percussion coal cutters, coal augers, rotary coal drills, n.o.p., and complete parts of all the foregoing, for use exclusively in mining, metallurgical or quarrying operations—

New—	7½%	20%	25%
Old—	10%	15%	20%

341—Babbit metal and type metal, in blocks, bars, plates and sheets.

New—	10%	20%	20%
Old—	10%	15%	15%

348d—Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables, for use only in the manufacture of such articles in their own factories—

New—	Free	10%	10%
Old—	Free	Free	Free

349—Brass in bars and rods, in coil or otherwise, not less than six feet in length, and brass in strips, sheets or plates, not polished, planished or coated.

New—	5%	10%	15%
Old—	5%	7½%	10%

350—Wire of all metals and kinds, n.o.p.

New	10%	30%	35%

352c—Coin locks of which solid brass or bronze are the components of chief value plain, polished or plated.

New—	35%	35%	40%
Old—	20%	27½%	45%
	20%	27½%	30%

353—Aluminum and alloys thereof, crude or semi-fabricated, viz.: Pigs, ingots, blocks, notch bars, slabs, billets and blooms; scrap; bars, rods and wire; angles, channels, beams, tees, and other rolled or drawn sections and shapes; pipes and tubes; plates, sheets and strips, including circles; leaf or foil, less than .005 inch in thickness, plain or embossed, with or without backing; wire and cable, twisted or stranded, reinforced with steel or not; aluminum powder—

New—	Free	30%	30%
Old—	15%	17½%	20%
	20%	27½%	30%
	Free	Free	Free
	15%	22½%	25%
	15%	27½%	27½%
	15%	25%	25%

354—Manufactures of aluminum, n.o.p.—

New—	15%	30%	30%
Old—	15%	22½%	25%

354a—Kitchen or household holloware of aluminum, n.o.p.—

New—	20%	30%	30%
Old—	20%	27½%	30%

354b—Kitchen or household holloware of nickel, n.o.p.—

New—	20%	27½%	30%
Old—	20%	27½%	30%

355—Nickel in ingots or blocks, n.o.p.; nickel bars and rods, not including bars or rods depolarized or otherwise processed for use as anodes; and nickel in strips, sheets or plates—

New—	Free	Free	Free
Old—	Free	Free	Free

Painting

Finish is a determining factor in the sale of many sheet steel products and when Youngstown sheets are used the result is almost invariably a better looking product.

The accompanying photograph shows a spray painting operation in the manufacture of one of the many hundreds of sheet steel products in which the use of Youngstown Sheets has resulted in easy-to-finish, better looking products.

YOUNGSTOWN SHEETS

Youngstown sheets will give you a new idea of sheet steel finishing qualities. Thousands of fabricators have tried them -- and made them standard.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices: YOUNGSTOWN, OHIO

One of the oldest manufacturers of copper-steel, under the well-known and established trade name "Copperoid"

YOUNGSTOWN

SHEETS FOR EVERY PURPOSE .. INCLUDING YOURS

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

EAST WALPOLE, MASS.—Bird & Son Inc. will build a 1-story, 80 x 85-foot plant, including material-handling equipment and cranes, about $40,000.

LYNN, MASS.—Thomson-Gibb Electric Welding Co. has formed a new department for the manufacture of wire mill and stranding machinery, pointers, takeup frames, cable-armoring and saturating equipment and electric brazing machines.

New York

BABYLON, N. Y.—Long Island Railroad Co., A. C. Watson chief engineer, Pennsylvania station, New York, is preparing plans for elimination of grade crossing on Sunrise highway, about $25,000.

BROOKLYN, N. Y.—Kent Purchase & Sales Co. has been incorporated with $1000 capital to deal in iron and steel, by Fisher & Fisher, 186 Joralemon street, Brooklyn, N. Y.

BROOKLYN, N. Y. — Ames Spot Welder Co. has been incorporated with $1200 capital to operate a welding and brazing plant, by Fisher & Fisher, 186 Joralemon street, Brooklyn, N. Y.

NEW YORK—Standard Sales Co. has been incorporated with $20,000 capital to deal in metal goods, by A. Schenkin, 5 East Forty-fifth street, New York.

NEW YORK—Prestomatic Corp. has been incorporated with $50,000 capital to manufacture electrical equipment, by W. L. Post, 84 William street, New York.

NEW YORK—William M. Rebuth Co. has been incorporated with 100 shares no par value to manufacture metal products, by Natanson, Rabin, Pack & Abrams, 271 Madison avenue, New York.

NEW YORK—Champion Stamping Enameling Co. has been incorporated with 200 shares no par value to manufacture enameled metal products, by M. Neuman, 160 Broadway.

New Jersey

GROVELAND, N. J.—Pennsylvania railroad, T. J. Skillman chief engineer, Broad street station, Philadelphia, is planning to eliminate grade crossing at Craig Colony road, about $99,000.

JERSEY CITY, N. J.—Savary & Glasser Inc. has been incorporated with $125,000 capital to deal in iron and steel, by Morey M. Beck, 591 Summitt avenue, Jersey City, N. J.

LINDEN, N. J.—General Insulating Corp. has been incorporated with $10,000 capital to manufacture cork insulation materials, by J. P. Nolan, 60 Broad street, New York.

NEWARK, N. J.—Carrier Products Corp. has been incorporated with 1000 shares no par value to manufacture heating appliances, by Charles J. Staples, 39 Cortlandt street, New York.

Pennsylvania

PHILADELPHIA—Keystone Lubricating Co., Clearfield and Lippincott streets, has let contracts for rebuilding its plant, completely destroyed by fire. Every modern appliance will be incorporated in the building and new equipment will be purchased. Temporary offices are established in the building of the Steel Heddle Mfg. Co., Twenty-first street and Allegheny avenue. H. A. Buzby is president.

PITTSBURGH—B. & D. Mfg. Co. has been incorporated with $5000 capital to manufacture valves for control of fluid pressure, by Harold W. Buckman, Ben Avon, Pa.

PITTSBURGH—United District Heating Co. has been given an $18,035 contract for a heating system for the Schenley Park conservatory, including a line to convey steam from the power house of the Carnegie Institute.

Ohio

NEW PHILADELPHIA, O.—A. E. Packer has opened a sheet metalworking plant at Ashwood lane and First drive.

OBERLIN, O.—City will vote in November on a proposition to erect a municipal electric light and power plant. A bond issue of $250,000 is proposed.

SALEM, O.—City council has received recommendations from a special committee headd by C. F. Zimmerman that a municipal electric light and power plant be built to furnish the city its own power.

Michigan

ANN ARBOR, MICH.—Hoad, Decker, Shoecraft & Drury, engineers, Ann Arbor, have completed a survey and plans for a $30,000 sewage disposal plant for Durand, Mich., to be built next summer.

BATTLE CREEK, MICH. — Albert Kahn Inc., Detroit, is preparing plans for two factory additions, six stories, for the W. K. Kellogg Co., Battle Creek, to cost $250,000.

BOYNE FALLS, MICH. — Hankey Milling Co. will rebuild its mill and elevator at a cost of $15,000.

DETROIT—Paterson Enginering Co. is low bidder on the general contract for a power house for the city of Shelby, O.

DETROIT—United States engineers are taking bids until Oct. 25 for dredging 836,450 cubic yards in Ballard channel, Detroit river.

DETROIT—Eastern Michigan-Toledo Railway Co., operating between Detroit, Monroe and Toledo, O., has suspended operations. The property probably will be sold and scrapped.

DETROIT—Fred Colman & Sons, tool and diemakers, have awarded a contract to H. C. Wright Building Co., Detroit, for a plant addition on Central avenue.

DETROIT—Bids will be asked soon for construction and maintenance for ten years of four incinerators to cost about $2,000,000, of 600, 600, 400 and 200 tons capacity.

DETROIT—Consolidated Metals Corp., 3315 Barlum Tower, has been incorporated with $50,000 capital to deal in metals, by Ellene Ellis, 1417 Wayburn avenue, Detroit.

DETROIT—Mead Screw Products Inc. has been incorporated with $18,000 capital to operate a machine shop at 2821 Brooklyn avenue, by D. Edmund Mead.

DETROIT—Reliance Foundry Co., 1933 Macomb street, has been incorporated to operate a general foundry business, with 5000 shares no par value, by Otto H. Sauer, 5735 Rohns avenue, Detroit.

DETROIT—Wheel Service Equipment Corp., 680 East Fort street, has been incorporated with $50,000 capital to deal in engines, automobiles, trucks, aircraft, yachts, tools, machinery, by Ernest Connor, 2490 Tuxedo avenue, Detroit.

DETROIT—Gyro Process Co., Detroit, has entered into an agreement with Alco Products Inc., a division of the American Locomotive Co., for the latter to assume exclusive licensing, sales, engineering and manufacturing rights for the Gyro vapor phase cracking process for manufacture of anti-knock gasoline, for the entire world except Canada.

FLINT, MICH.—Flint Die & Tool Co., 1016 Merrill, has been incorporated with $50,000 capital to design and manufacture tools and dies, by Fred J. Duesberry, 705 North Stevenson street, Flint.

JACKSON, MICH.—Fargo Engineering Co., Jackson, has made plans for a sewage disposal plant, including pumphouse, control house, garage and interceptor sewers, to cost $660,000.

MUSKEGON, MICH.—Grand Trunk Western railroad has started building new switching yards at Muskegon, costing about $45,000, part of a $1,000,000 development project here.

MUSKEGON, MICH.—Orion Electric Co., West Laketon and Sixth streets, has been incorporated with $10,000 capital and 1000 shares no par value to manufacture electric transformers, ignition coils, dynamos, motors, and electric devices in general, by S. Frank

Cox, 58 Glendale avenue, Highland Park, Mich.

MUSKEGON, MICH. — American Show Case & Mfg. Co. has bought the business of the Michigan Store Fixture Co., Detroit, equipment being moved to the Muskegon plant where manufacturing of store fronts and fixtures will be concentrated. Harry Sheresky, president of the Detroit company, has been made vice president of the Muskegon organization.

PORT HURON, MICH.—Robert J. Waddell of St. Clair and Detroit, has bought the Bohn Aluminum & Brass Corp. plant at South Port Huron, Mich., and will lease it soon for manufacturing purposes.

SAGINAW, MICH.—Francis Engineering Co., Saginaw, is preparing plans for an electric generating plant at Alpena, Mich. Authorization of the project will be voted on at the November election.

Indiana

MISHAWAKA, IND.—City, W. R. Hinkle mayor, is about to undertake a survey of possibilities of a municipal electric light and power plant.

PERU, IND.—City council is planning installation of a 5000-kilowatt turbine for the municipal electric light and power plant, entire improvement to cost about $100,000. C. H. Brossman, 1009 Chamber of Commerce building, Indianapolis, engineer.

Illinois

CHICAGO — Grunow Corp., 4127 George street, has been incorporated with a Delaware charter, capital $300,000, to manufacture electric refrigerators. Part of equipment has been bought but the plant is not ready for production.

EAST ST. LOUIS, ILL.—Elliott Frog & Switch Co., 301 South Main street, plans construction of four 1-story buildings for machine shop use, at cost of $65,000, including equipment.

EAST ST. LOUIS, ILL.—Milnan Enginering Co., 1235 Piggott avenue, has been incorporated to manufacture oil burners, by H. W. Miller and C. C. Nangle.

Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids until Nov. 1 on schedule 8899 for one motor-driven plain milling machine, schedule 8900 one motor-driven cut-off saw, schedule 8903 one motor-driven hack saw, for delivery to Mare Island, Calif.; to Oct. 25 on schedule 8888 for one motor-driven drill grinding machine, schedule 8889 for one balancing machine for delivery to Norfolk, Va.; schedule 8896 for one portable electric-driven air compressor for delivery to Mountain View, Calif.

NEW ORLEANS—J. Depuy, Milam building, San Antonio, Tex., has been given a contract by the United States engineers office here to construct the Vermillion locks in the intracoastal system in Vermillion parish, Louisiana, to cost $300,000.

CHARLESTON, W. VA.—Valley By-Products Coal Co. has applied for federal permission to construct a coal-loading plant on the Big Kanawha river.

HUNTINGTON, W. VA.—Bids have been opened by United States engineers for equipment for the Marmet lock and dam on the Big Kanawha river, including powerhouse machinery and tow haulage units.

Missouri

ST. LOUIS—Vivian Mfg. Co., manufacturer of ice and refrigerating machinery, L. R. Barber president, has moved into its new plant at 4136 Folsom avenue.

ST. LOUIS—International Oil Heating Co., 3808 Park avenue, is erecting a 2-story building 70 x 125 feet, for an assembly plant and office. S. J. Heiman is president.

ST. LOUIS — Daytona Accessories Mfg. Co., Chicago, is installing a branch manufacturing plant at 10 North First street, in a 3-story and basement building containing 10,000 square feet, for the manufacture of automobile accessories.

Oklahoma

BRISTOW, OKLA.—Kelly & Beck have started operation of a machine and welding shop at 219 South Main street. C. L. Almonrode and Julius Beck are owners.

Texas

GLADEWATER, TEX. — Gladewater Refining Co., George J. Ames manager, has suffered $50,000 loss by fire in its plant and will rebuild at once.

STRAWN, TEX.—Bishop Machine Works, H. D. Bishop owner, formerly located at Ranger, Tex., has started operation of a machine shop at Strawn.

Wisconsin

JANESVILLE, WIS.—Northern Conveyor & Mfg. Co. has booked an order from the Rock County Sugar Co., of this city, for a 250-foot conveyor system for use at its flumes at its beet sugar refinery.

MILWAUKEE—A. O. Smith Corp. has taken on 200 toolmakers in preparation for enlarged production of automotive products.

MILWAUKEE—Oil Selectometer Co. has been organized by E. F. Vilter and E. T. Reynolds Jr., 307 Franklin Bank building, to manufacture testing devices

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MILWAUKEE — Claybourne Corp., manufacturer of printing and lithographing presses, has booked two orders from Chicago interests for presses valued at $120,000, enabling it to keep its plant on full time production.

MILWAUKEE—Allis-Chalmers Mfg. Co. has booked an order from the board of transportation, New York, for mercury arc rectifier equipment and transformers for feeding the third rail system of the new Eighth avenue subway. High-tension oil circuit breakers and switching equipment are included. The contract is worth over $500,000.

NEENAH, WIS.—Manhattan Rubber Co., Passaic, N. J., has opened a branch plant at Neenah to manufacture rubber-covered rolls for paper mills. Arthur Campbell has come from Passaic as manager.

OSHKOSH, WIS.—Bids will be taken until Oct. 24 by the board of public works for complete pumping and motor equipment for two sewage pumping stations, bond provision having been made for the cost. G. W. Randall is city engineer.

RACINE, WIS.—Young Radiator Co., manufacturer of radiators, cooling systems and heating units, has added a line of new type blast coils and a new type electric heater to its products.

RICE LAKE, WIS.—Edward Hines Lumber Co. will reconstruct and repair its lumber mill at a cost of $40,000.

RHINELANDER, WIS.—Burns & McDonnell, Kansas City, Mo., consulting engineers have been selected by the city council to make surveys and submit recommendations for a municipal power plant.

WAUSAU, WIS.—Underwood Veneer Co., O. C. Lemke, manager, will build a sawmill at Bessemer, Mich., near its hardwood holdings.

South Dakota

ABERDEEN, S. DAK.—Bids will be taken in November on a municipal electric light and power plant, including stokers, about $900,000. Bemis Co., 105 West Adams street, Chicago, are engineers.

Iowa

CEDAR RAPIDS, IOWA.—Chandler Pump Co., C. R. Chandler president, has resumed production after being idle about 18 months. Foundry operations were started first, followed by activity in the machine shops.

OTTUMWA, IOWA—Swanson Mfg. Co., manufacturer of electrical supplies, has moved its operations from Decorah, Iowa, to Ottumwa, to obtain better manufacturing facilities.

WATERLOO, IOWA—Rath Packing Co. has let a contract for a 5-story lard refinery, estimated to cost about $60,000. Conveying machinery and tanks are included in the needed equipment.

Nebraska

AINSWORTH, NEBR.—City has awarded to Fairbanks, Morse & Co., Omaha contract for construction of an electric light and power plant, conditional on the city supplying two engines of at least 186 and 232 kilowatt capacity. The plant will cost $99,178.

Colorado

COLORADO SPRINGS, COLO.—City council, E. L. Mosley, manager, is outlining a five-year program of waterworks construction, including reservoirs at source and steel pipeline to city. Total cost will be about $1,000,000. Start will be made in 1933.

DENVER—Bureau of reclamation will receive bids Oct. 20 for furnishing eight emergency and regulating gates, 4 feet nine inches by 12 feet, with frames, hoists, conduit linings, gate hangers and meter pressure rings for controlling works on the Owyhee project in Oregon.

FT. COLLINS, COLO.—Special election will be held soon on an issue of $745,000 bonds for a municipal electric light and power plant. Burgis C. Coy, Ft. Collins, is engineer.

Wyoming

OSAGE, WYO.—Wyo-Dak Chemical Co., Cleveland, has completed its mill at Jerome siding, between Osage and Upton, Wyo., with capacity of 60 tons per day, to process bentonite from nearby deposits.

Idaho

WALLACE, IDAHO — Generator plant of the upper Burke works of the Federal Mining & Smelting Co. has been destroyed by fire. A large switchboard and other equipment was also destroyed.

Arizona

NOGALES—City council plans a municipal electric light and power plant, the first unit of which will cost about $40,000, later units to be added.

Pacific Coast

INGLEWOOD, CALIF.—Moler Mfg. Co., 321 North Eucalyptus avenue, manufacturer of electric refrigerators, has added a line of portable room coolers, using an electrically-driven blower and also a stationary air conditioning unit.

LOS ANGELES—Southern California Gas Co. is building a shop estimated to cost about $80,000.

LOS ANGELES—Fluor Corp., P. E. Fluor general manager, 909 East Fifty-ninth street, manufacturer of water-cooling towers and systems, has opened a plant for the manufacture of a new type of storage battery.

LOS ANGELES — General Machine Works, 3133 San Fernando road, B. M. Freshman manager, has started the manufacture of automatic electric time switches for coin-operated mechanical equipment.

NORTHPORT, WASH. — Deertrain Monitor Mines Co., J. Richard Brown president, has a deposit of molybdenum ore and is considering erection of a mill to handle tonnage output.

PUYALLUP, WASH.—Puget Sound Power & Light Co. will equip a leased building at Stewart street and Second avenue for a district maintenance shop.

Dominion of Canada

FERNIE, B. C.—Imperial Oil Ltd. will build a plant costing about $1400, including pump house, electric pumps and four 50,000-gallon steel tanks.

PENNY, B. C.—Red Mountain Lumber Co. plans erection of a lumber mill to cost about $50,000.

WINNIPEG, MAN.—Industrial development board of Manitoba, Winnipeg, J. M. Davidson secretary and manager, is holding conferences with steel capitalists on the establishment of a steel plant here.

PETERBOROUGH, ONT.—Bids will be taken soon by the Ontario department of highways at Toronto for a high-level bridge over Otanobee river here, 500 feet long, with three main spans, two approach arches and two approaches, to cost $100,000.

SMITHS FALLS, ONT.—Smiths Falls Castings Co. has been organized to take over, reopen and operate the plant of the Smiths Falls Malleable Castings Co., idle for some time. Some new equipment will be needed.

TORONTO, ONT.—Igloo Refrigeration Co. Ltd. has been incorporated with 40,000 shares no par value to manufacture devices, by James A. Ross, Toronto.

TORONTO, ONT.—Arthur Leslie Auto Parts Ltd. has been incorporated with $40,000 capital to manufacture automobile parts and accessories, by Arthur Leslie, Toronto.

TORONTO, ONT.—Dental Utilities Ltd. has been incorporated with $40,000 capital to manufacture dental instruments and supplies, by Maurice Crabtree, Toronto.

WELLAND, ONT.—Canadian Tool & Mould Co. Ltd., newly organized, has taken over the plant formerly operated by the Pyramid Mfg. Co. Gordon Kartzmark, Hamilton, Ont., is manager. The company manufactures rubber and bakelite molds.

QUEBEC, QUE.—City engineer is preparing a report on the practicability of an incinerator system for refuse disposal. F. V. Chouinard is city clerk and Edouard Hamel chief city engineer.